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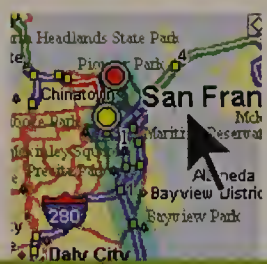

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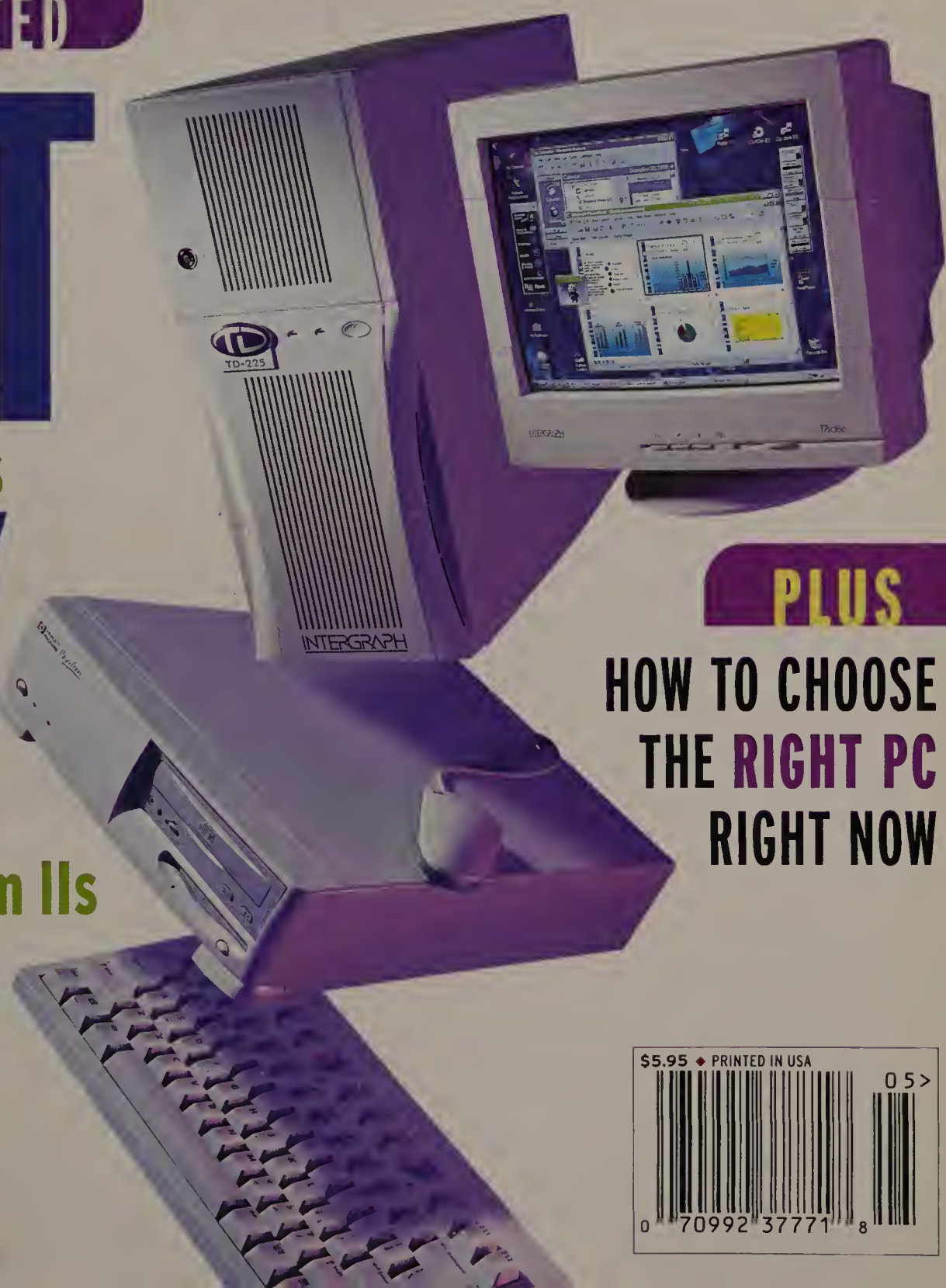

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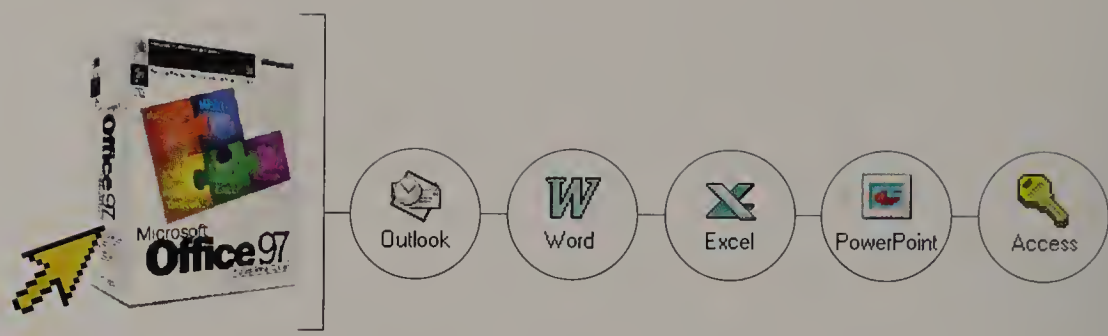

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MAY

VOLUME 16 ◆ NUMBER 5

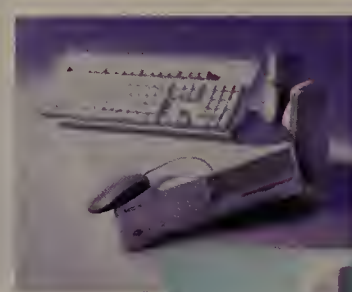
COVER STORY

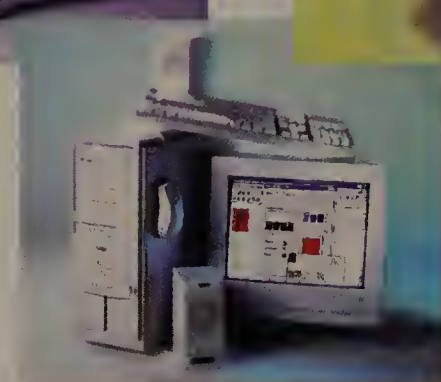
BEST BUY PCs: FROM $700 BARGAINS TO 333-MHz PIIs

So what's your choice—extreme power, a laughably low price, or something sensible in the middle? We found the best of 132 desktops and notebooks, all newly tested with PC WorldBench 98. Plus how to pick the right PC for your needs.

96 **How Much PC Do You Need?**

227 **Sub-$1000 Bargains, 333-MHz Beasts**





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HOW-TO You need one kind of PC, your assistant needs another, and your boss—well, who knows? We explored them all—from stripped-down economy models to dual-Pentium NT workstations—and found everyone's sweet spot.

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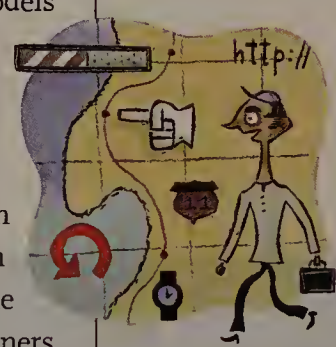
REVIEW We plugged, we played, we hot-swapped till we dropped—using 18 real-world devices, from monitors to mice. The good news? USB actually works.



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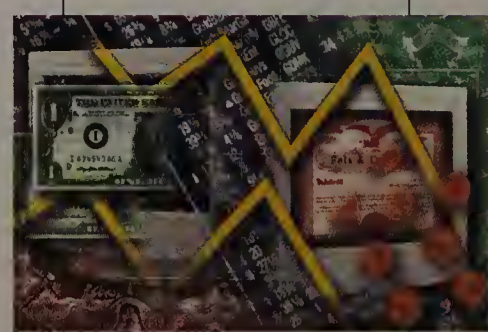

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Additional material available on PC World Online: www.pcworld.com

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Oscar, schmoscar. Sure, you know that *Titanic* is a great movie. But did you know that Exploranet is a great Web site? Set course for the 95 coolest cyberdestinations courtesy of the second annual Webbies, the Academy Awards of the Internet.

COVER *Photography by Stan Musilek*

ICONS: JEFFREY PELO

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TOP 100

227 SUB-$1000 BARGAINS, 333-MHz BEASTS
online Trying to make sense of all the specs and speeds? Our lab ran 132 systems through PC WorldBench 98, our new applications test suite. We uncovered great buys across the board, from HP's bargain Pavilion 3260 and Gateway's midrange G6-266b to Dell's powerful Dimension XPS D333.

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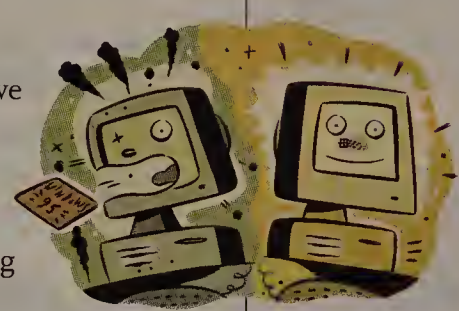

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HOW-TO Turbocharge your Web browsing with this ever-expanding collection of Netscape Communicator tips: shortcuts, productivity hints, and information on living with Internet Explorer.
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- Millennia Xku, *PC Magazine*, September 1997

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Millennia Xku
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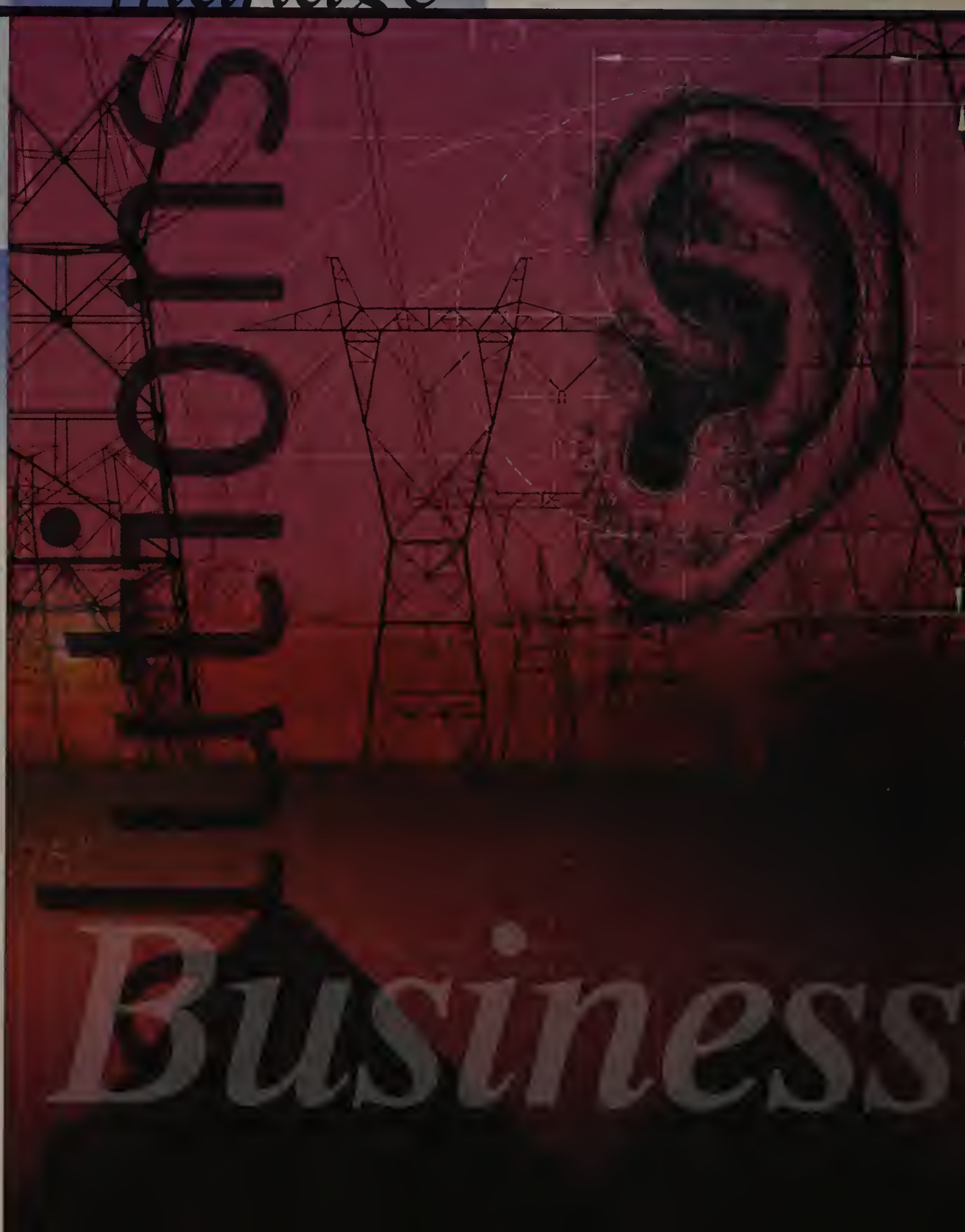

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12X SCSI-2 CD-ROM drive
10 drive bays: 4 external 5.25"/1 external 3.5"/2 internal 5.25"/3 internal 3.5"
Intel LANDesk® Server Manager 2.8
Dedicated server technical support, 7x24
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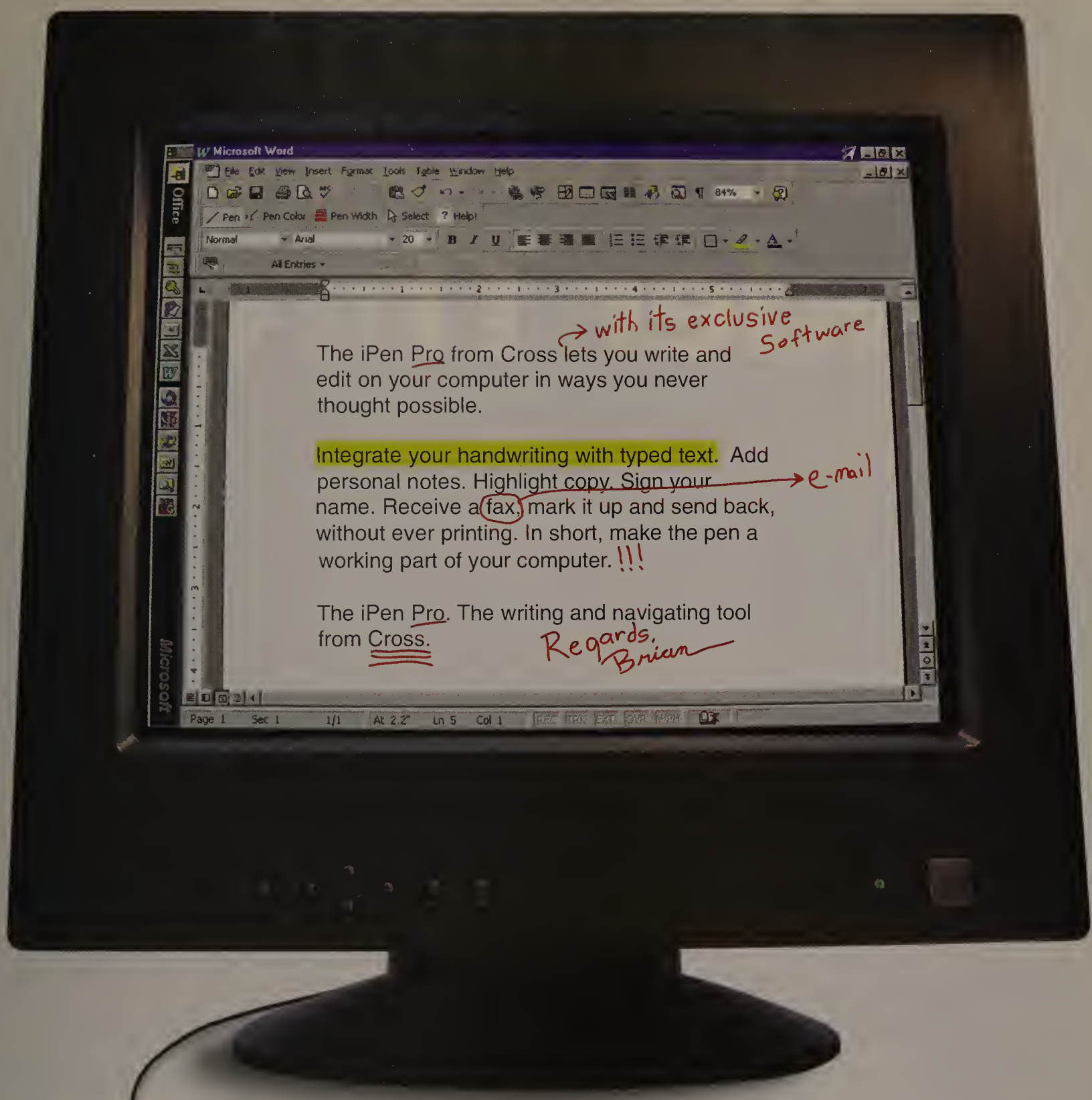

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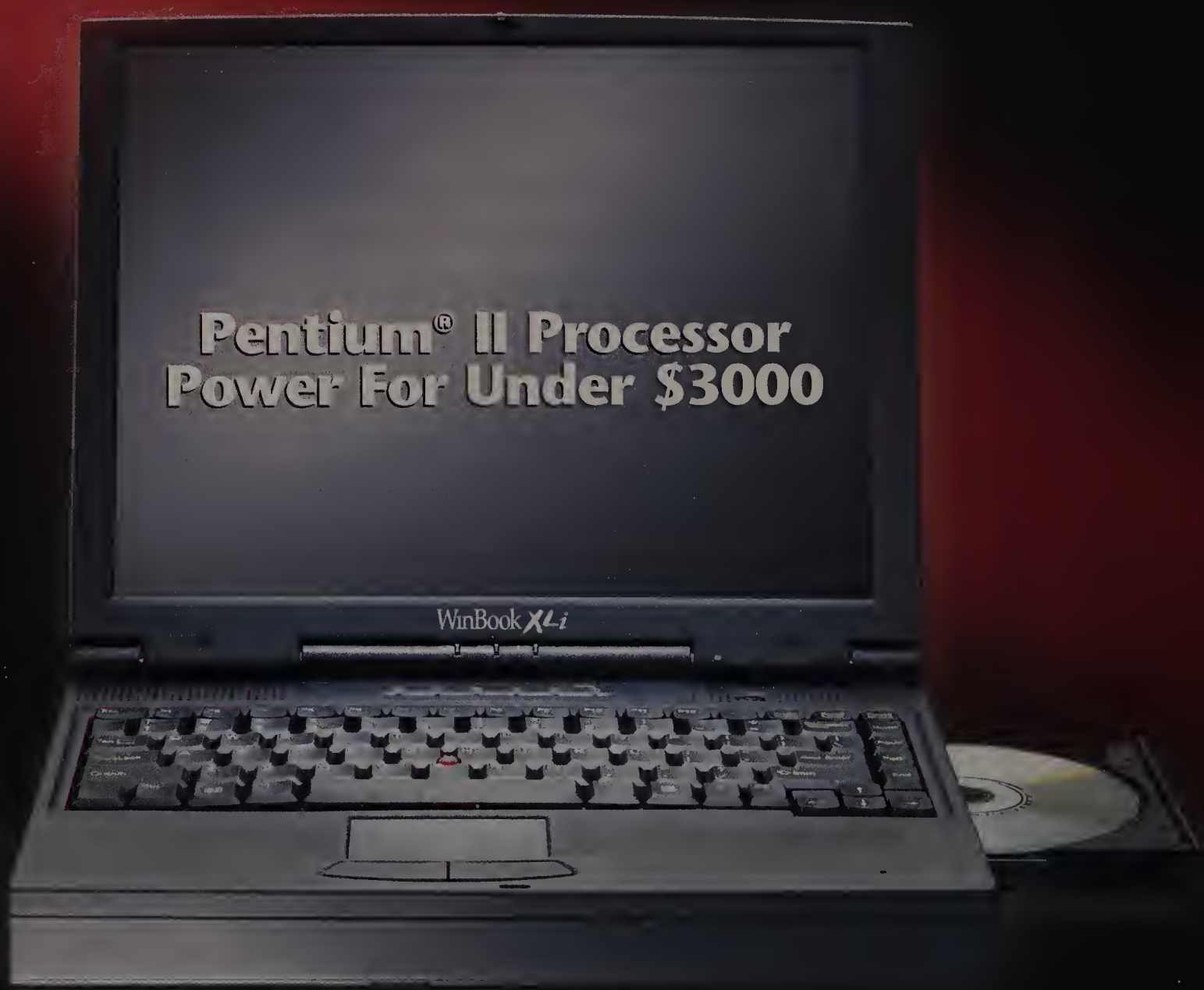

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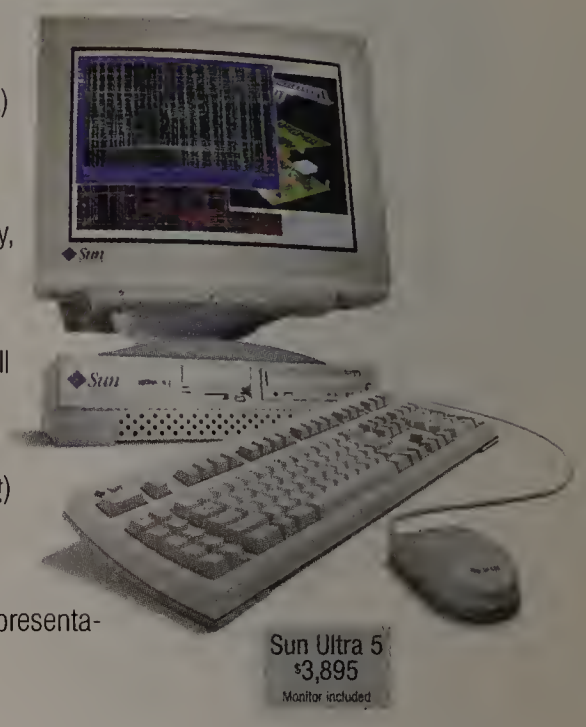

With these workstations, you can run heavy-duty applications one moment, then craft presentations using Microsoft® Office® the next. What's more, the Ultra 10 with its Elite3D graphics blows away a similar SGI machine. And at less than *a third* of the cost.** And since both Sun models are binary compatible, they'll run over 12,000 applications available for Sun. (And now every PC application beneath it.) All of which just may make them the missing links you've been looking for. For more information, call 800-SUN-FIND for a Sun reseller or representative near you. Or visit our Web site at sun.com/ult/pmg. THE NETWORK IS THE COMPUTER.™

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Get the Speed You Need

HALLELUJAH FOR CHEAP PCs! Brand-name 233-MHz systems sell for a cool thousand bucks, and PC makers hint at $500 systems coming soon. Intel is trying to break into the market with its new Celeron processor—a Kmart version of the Pentium II—and plans to roll out a second low-cost processor later this year. The action is not confined to low-end systems. PC makers are pricing the latest Pentium II-300 and -333 systems as low as $2200 to clear the way for upcoming 350- and 400-MHz Pentium II PCs. Windows NT workstations with the fastest processors are going for as little as $3000.

Until now, we've urged buyers to play it safe, and buy as much PC as they could afford. But does it still make sense to spend $2000 or more for the fastest, latest PC? Are $1000 PCs now good enough? And the critical question for speed freaks: Just how much of a performance advantage will you gain by paying more?

Does it still **make sense** to spend more than **$2000** for the **fastest,** latest PCs? Or are **$1000** PCs **good enough?**

HOW FAST IS FAST?

COMPARING SPECIFICATIONS of PCs is simple enough, but it's not so easy to judge the difference PC performance will make in getting real work accomplished. Enter PC WorldBench 98, *PC World*'s new test suite for measuring overall system performance.

Consider these facts:

- IBM's Aptiva E16, which costs $700 without a monitor, is 25 percent slower than the Aptiva E26, which sells for $1000. The E16 completes a set of Excel speed tests in more than 11 minutes, while the E26 takes 8 minutes.
- That same Aptiva E16 is almost 50 percent slower overall than Gateway's G6-266b system, this month's top budget Best Buy, which sells for about $1900, including monitor. The Gateway takes about 4.5 minutes to run through the Excel tests.
- That Gateway PC is just over 10 percent slower than Dell's PII-333 system, this month's top power Best Buy, which sells for about $2900 and includes almost everything you could possibly crave. On the Excel tests, the Dell takes just over 4 minutes.
- That Dell PC is 20 percent slower than a Micron Powerdigm dual Pentium II-300 workstation, one of the fastest NT 4.0 workstations we tested, which sells for more than $4000. On those same Excel tests, the Micron machine takes just under 4 minutes (where it really shines is in 3D graphics).

Clearly, at the low end, small savings equal big compromises in performance. But it's also clear that spending more money at the high end may not net you substantial speed boosts. The performance you'll gain by opting for the Dell over the Gateway PC is minimal. Instead, the extra $1000 you pay for the Dell buys you an 8GB hard drive, a DVD-ROM drive, and more.

WHAT'S NEW WITH WORLDBENCH 98

FOR THE INTRODUCTION OF PC WorldBench 98, we tested 132 desktop and notebook PCs priced from $700 to $7000. The result: detailed test scores that show clear performance differences like those above for different classes of PCs, as well as performance differences for PCs within the same class. To cite one example of the latter: Micro Express's Pentium II-300 PC achieved a WorldBench score of 161; it comes with 64MB of RAM, a 512KB secondary cache, and an ATI Xpert@Work graphics board with 8MB of SGRAM. The Micro Express PC is about 18 percent faster than Quantex's SM-4xSE PII-300 PC—hard evidence of the contribution that system RAM, secondary cache, graphics card and memory, chip sets, and drivers make to overall performance.

An update of WorldBench 1.0, WorldBench 98 measures overall PC performance by running a suite of real business applications through a series of test scripts. For WorldBench 98, we eliminated all 16-bit applications and and now include the latest 32-bit versions of six popular applications. We revised the test suite to run not only on Windows 95 but on NT 4.0 and Windows 98 as well. We also updated our scoring system to make it as straightforward and relevant as possible. We compare the scores of all PCs we test to the base score of a reference system. For WorldBench 98, our new reference system is a Gateway G5-200 MMX PC. All WorldBench 98 scores compare PC performance to the reference system's score of 100. For example:

- A system with a score of 140 is 40 percent faster than the reference Gateway MMX-200 PC.
- A system with a score of 200 is four times faster than one with a score of 50.

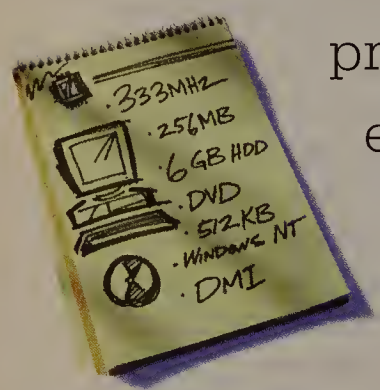
By exercising machines the same way PC users do, WorldBench gives PC buyers a practical way to identify elusive but real performance differences. Speed freaks, take note.

Cathryn Baskin is editor in chief of PC World. ■

PHOTOGRAPH: ERIK BUTLER

Replace motherbo
Then go on to perf

Introducing Toshiba's new Equium™ 7000 series with the Intel Pentium® II processor. Built into each desktop is a unique Instant Access door that lets you reach the motherboard through the side of the chassis. No other computer maker has anything like it. Which means that without removing the monitor, this new patent-pending design lets you replace the motherboard in 30 seconds†. Get in, get out, get back to work. This modular design is just one more example of how



Just give us your list. We can custom-configure desktops to your exact specs of memory, processor and depth of features.

† © 1998 Toshiba America Information Systems, Inc. *Price for Equium 7000S part #1043U-0000, 233MHz, 32MB SDRAM, 2GB HDD, 1.44MB FDD, Intel Ethernet Network, Windows '95.
†30 second time assumes no external system cables are connected to the motherboard. All prices, specifications and availability are subject to change. Equium is a registered trademark of Toshiba America Information Systems, Inc. All products indicated by trademark symbols are trademarked and/or registered by their respective companies
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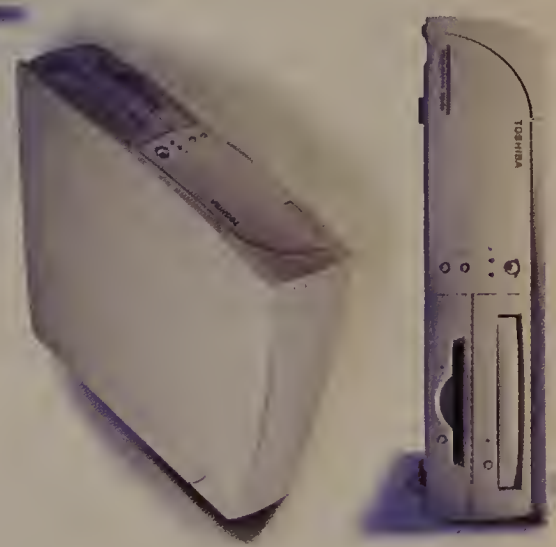
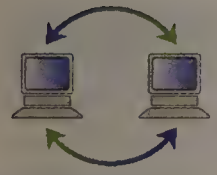
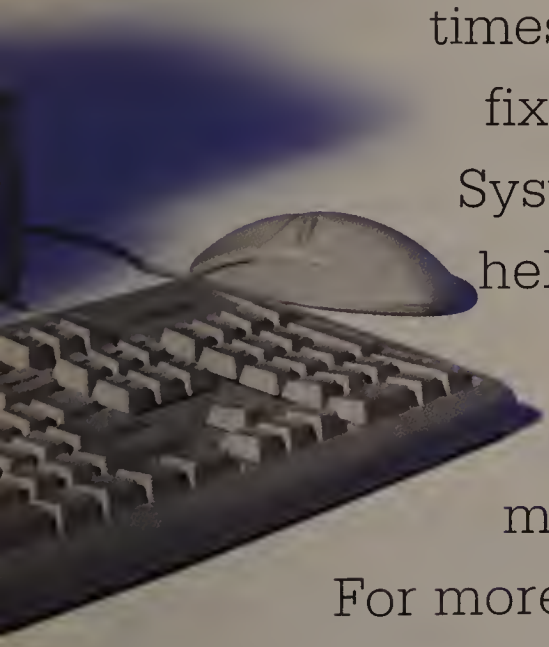


Toshiba is taking the desktop seriously. Other examples? Flexibility in any working environment—your Equium can operate as a traditional desktop, a vertical tower, or, for the truly cramped, a wall-mounted unit. Consistency of components means both Equiums share parts, so you can cut qualification times. They even feature a self-fixing Expert Intelligent Help System to reduce calls to your help desk. The most flexible, cost-efficient corporate PCs on the market. They're not miracles. They're Toshibas. For more details, give us a click at http://computers.toshiba.com, or simply call us toll-free today at 1-888-598-7802.



Key components for both Equiums are 100% interchangeable. As for qualification? Test one, and you've tested them all.



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TOSHIBA

Circle 234 on reader service card

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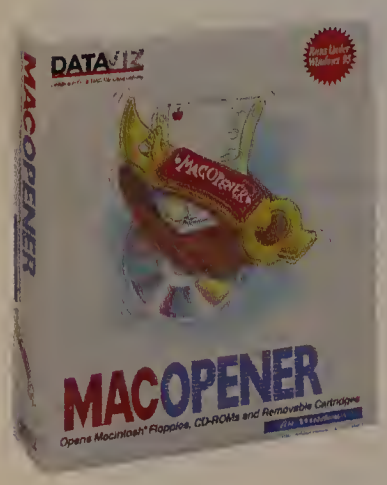

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Circle 81 on reader service card

YOUR TAKE ON: PC leasing ◆ Paying to be a beta tester ◆ Internet phones

WHAT'S THE BIG DEAL ABOUT LEASING?

REGARDING "Look Before You Lease" [*Consumer Watch*, March]: Of course the sum required by Dell to lease its PCs is greater than the cost to purchase them outright. Dell is fronting the cash for the machines, and the lessee is using the company's money for two years; for this service, Dell charges a fee (interest). This is a huge benefit for someone who either does not have the cash for a new PC or does not want to buy a new PC outright. Why is it that no one questions this concept when leasing a new car but considers it unfair when applied to computers?

Jeff Wofford, Internet

UNREVIEWED, UNIMPROVED

IN MARCH'S *Up Front* column, Cathryn Baskin states, "PC hardware and software problems are so common that we've come to accept them as normal." As a ten-year subscriber who builds PCs for a living, I believe that your magazine is somewhat to blame for this situation. Until Windows 3.1 came out, most of the magazine was devoted to hardware, including reviews of motherboards. You played an important part in helping motherboards mature. If you pointed out a fault in one board, a few months later that problem always seemed to be resolved. But now motherboard manufacturers don't get your feedback. As a result, I can't tell you how many motherboards are incapable of, say, running a CD-ROM drive in real mode.

If we don't start with good hardware, how much can we fault software makers for compatibility problems?

Randy Boettjer, Oak View, California

A DRASTIC SOLUTION

IF THE GOVERNMENT fines Microsoft, consumers will eventually pay the penalty ["Justice vs. Microsoft," *Top of the News*, February]. Either turn the entire software industry over to Microsoft's blackmail, or separate the OS from the applications, invoke eminent domain, and put the development of the OS in the hands of a nonprofit scientific consortium to address all future upgrades and releases. Microsoft's own actions leave no other choice.

Jerry Drummond
West Henrietta, New York

WINDOWS 98 ALREADY A CASH COW

YESTERDAY I RECEIVED an e-mail from Microsoft offering me the opportunity to become a Windows 98 beta tester for only $29.95. It has reached the point where we have to pay for the privilege of using an admittedly buggy piece of software (beta 3). And Microsoft says it will not offer credit toward the purchase of the final retail version. What refreshing honesty!

Phil Pfeiffer, Hanover, Pennsylvania

RADIO HAM

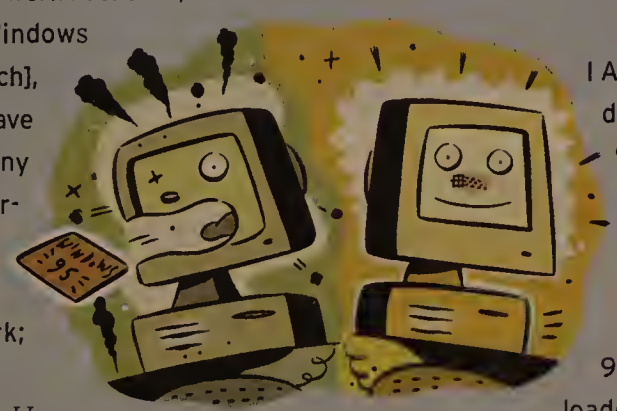
IN THE STORY on stand-alone Internet telephones ["Net Phones Still Wrong Number," *Top of the News*, March], ▶

HOT BUTTON

Windows 95: Hurting or Healthy?

IN TWO YEARS WITH Windows 95, my computer has never crashed despite all the game playing, Internet browsing, graphics running, and other computer work I do. Sure, we need tips and tricks ["Windows 95 Headaches," March], but that's why we have *PC World*. Hey, if any of you armchair quarterbacks can make a better operating system, get to work; we're waiting!

Linda Homan
Spotsylvania, Virginia



I ABANDONED Windows for a more stable operating platform on my PC at home: IBM's OS/2. I am no longer frustrated by a system that crashes ten times a day, and instead have a reliable and robust operating system. Unfortunately, I still have to use Windows at work. Maybe someday our corporate leaders will realize how much lost productivity they're paying for, but until that time I'll just keep rebooting Windows.

Allen Roberts, Winooski, Vermont

I AM ONE OF the many dissatisfied Windows 95 users. I have a good, powerful system (top of the line just one year ago) that runs Windows 95. I must have downloaded three fixes since then, but it still is slow, cantankerous, moody, and unreliable. My printers are all messed up. E-mail is a disaster. All the milliseconds my 200-MHz MMX system saved me have been squandered by this gluttonous, slovenly, ill-conceived program. Thank God my car, refrigerator, telephone, and TV don't behave the same way!

John Lusk, Internet

YOUR ARTICLE implies that everyone who uses Windows 95 should expect a technological nightmare. Of all the PCs that I support, only one would not work at all with Win 95. It was a 33-MHz 486 Packard Bell. Of all the problems you detail, I have seen only a small fraction in real life, and they have been no more than a 6-inch hurdle to clear.

Charles Dougherty, Las Vegas

I FIND YOUR work-arounds and fixes unnecessary in most cases, and using third-party software to enhance Windows 95 can cause other problems. What works on one version of the OS may not work on another. Windows 95 will work differently depending on who installed it—you, an OEM, or a store. It also depends on whether it was installed barebones, over Windows 3.1 or Windows for Workgroups, in dual-boot, and so on. Knowing your system is your best bet.

Lyman P. Tryon
Colorado Springs, Colorado

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you compared them to a ham radio call to Siberia. Funny line, yes, but I disagree. Ham radio calls to Siberia are usually a lot clearer. I'm a ham radio operator, and I have talked to Siberia more than once.

Cliff Mullican, Fort Worth, Texas

WHEN WARRANTY CARDS HELPED

THE MARCH *Full Disclosure* column by Stephen Manes ["PCs: Where Quality Is Job 187"] was right on point. Years ago, hardware and software manufacturers used warranty cards to notify the purchaser of bugs and modifications and would send you updates for the cost of shipping. Now warranty cards are used to develop mailing lists for selling the company's other products. The only way an individual can learn about updates is through magazine articles or the Internet.

Leland E. Hewgley
Hendersonville, Tennessee

PCW, CONSUMER REPORTS: RATINGS MAY VARY

I RECENTLY PURCHASED an Epson Stylus Color 600 printer because of your recommendations. I was dismayed to then get my latest issue of *Consumer Reports*, which rated this product at number seven and gave the HP DeskJet 722C a Best Buy. It seems surprising to me that *PC World* and *Consumer Reports* could differ so much on a product ranking. I realize that *CR* takes no advertising and that you may be constrained by your advertisers, but still, the discrepancy in testing results seems large.

Scott Cox, Richmond, Virginia

Editor's response: We haven't recommended the Epson Stylus Color 600 since October, the last time it was on our Top 10 Printers chart. We prefer its faster, fuller-featured sibling, the Stylus Color 800 (number three on our April chart). Like *Consumer Reports*, we think Hewlett-Packard's DeskJet 722C (in fourth place in April) is a good printer, but we don't give it a Best Buy because of the HP's somewhat high price, lack of toll-free support lines, and poor documentation. The amount of advertising a company places with us does not affect our reviews of its products. Our rankings are based strictly on our own testing and evaluations.

—Karen Silver, Associate Editor

CORRECTIONS & CLARIFICATIONS

• In our March review of removable drives ["A Gig in Your Pocket"], *PC World* gave the Iomega Zip EIDE drive a Best Buy. After that issue went to press, we learned the drive is offered only as an option on new computers from PC vendors. Because the Iomega Zip EIDE is not available to customers through retail, we are forced to withdraw our Best Buy recommendation. According to Iomega, the Zip EIDE will be available in retail stores nationwide in late April.

None of the Zip drives tested for March's roundup, including the internal one, exhibited the "click of death" disk lockup problem this month's *Bugs and Fixes* (page 53) reports.

• March's *Top of the News* gave the price of a five-user license for Microsoft's Windows NT Server 5.0 as $739. The price is $809.

• In March's Internet feature "Web Searching—Faster, *Faster!*" the URL for the item "Get directory assistance" (page 171) should have been www.555-1212.com/aclookup.html.

• In March's "Windows 95 Headaches," a few URLs were incorrect. Corrections are as follows: "Sticky Window Settings" (page 120), www.microsoft.com/windows95/info/powertoys.htm; "Win 95, Desktop Dictator" (page 120), members.aol.com/ezdesk95; and "DOS Games Won't Play" (page 122) in "Windows NT Gotchas" www.microsoft.com/windows/thirdparty/winlogo.

• In March's *@Home*, our Net2Phone review stated the service's long-distance Internet phone rates incorrectly; the actual rates are 15 cents per minute at peak times and 10 cents per minute off-peak.

• In April's "Best Free Stuff Online," the correct URLs for the following items are: Folder Organizer (page 107) and Eh Windows Reminder (page 108), tp.lc.ehu.es/win95.html; Plugsy (page 110), www.digigami.com/plugsy; RealAudio Tuner (page 110), www.dragontek.com/RATuner (this address is case-sensitive); and My Yahoo Ticker (page 116), my.yahoo.com/ticker.html.

PC World regrets the errors.

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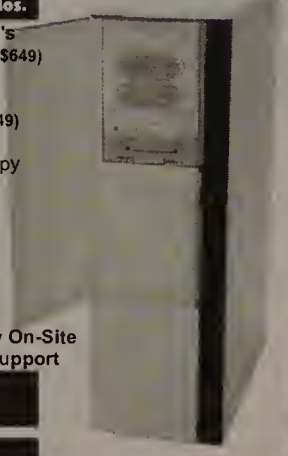

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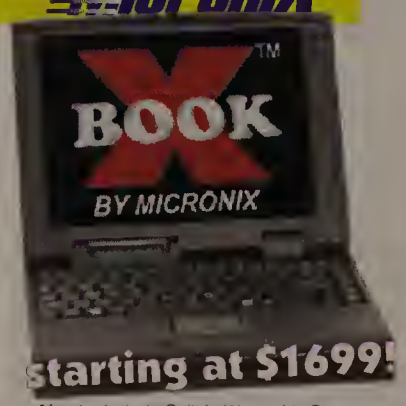

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EAT THAT COOKIE!

PERSONAL WISH: That responsible computer magazines (such as *PC World*) would do more to inform the computing public of the basically benign capabilities of cookies [*Internet Tips*, March]. Too many people surf the Net with the misinformed belief that cookies can read their hard drive, tell everyone all the sites they have surfed to, supply their name, address, and telephone number, and a whole lot more. Their surfing experience might be a lot more enjoyable if they knew that cookies are not an evil treat served by a witch in a black hat.

D. L. Smith, Internet

LOOK IT UP ON YOUR PDA

A PRIMARY APPLICATION for handheld PCs like the PalmPilot, it seems to me, should be for reading software and hardware documentation on-site. In almost a month of searching, however, I have found that practically all such documents on the Web are in Adobe's Acrobat format, which is not suitable for handhelds. I can't help but wish that the authors had posted text files as well, so I could have converted them to my platform. Admittedly, I am not very knowledgeable about copyright law, but couldn't this be done?

Phil DuPont, Pittsburgh, Pennsylvania

PC World *welcomes your responses, ideas, and other letters to the editor.* *See page 14 for contact information.* ■

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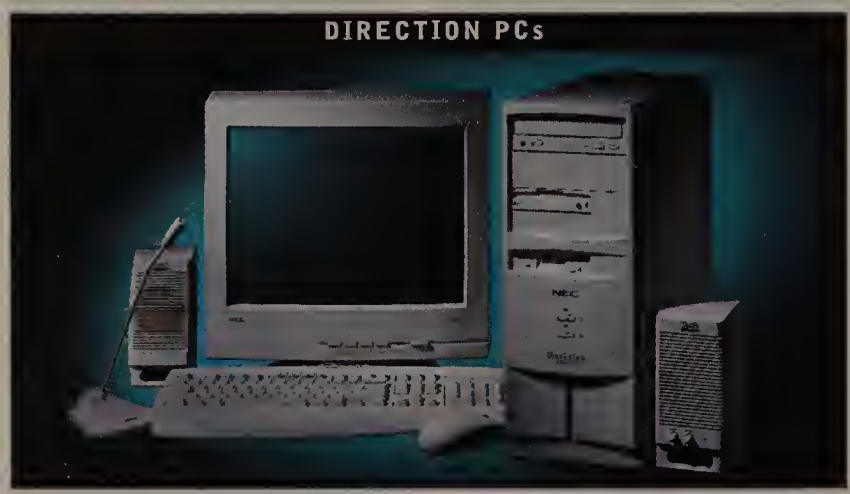

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Direction SPL300 - PC Computing, Mar. 1998

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Portable Computing Direct Shopper, Mar. 1998

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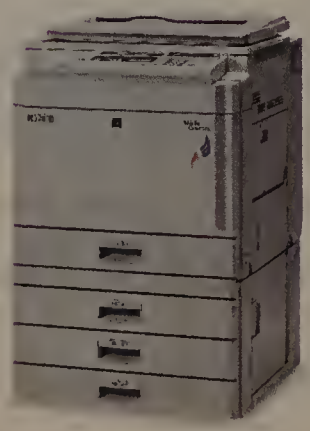

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Don't Get Fleeced at Online Auctions

Online auctions can offer bargains, but beware—the deals aren't always what they seem.

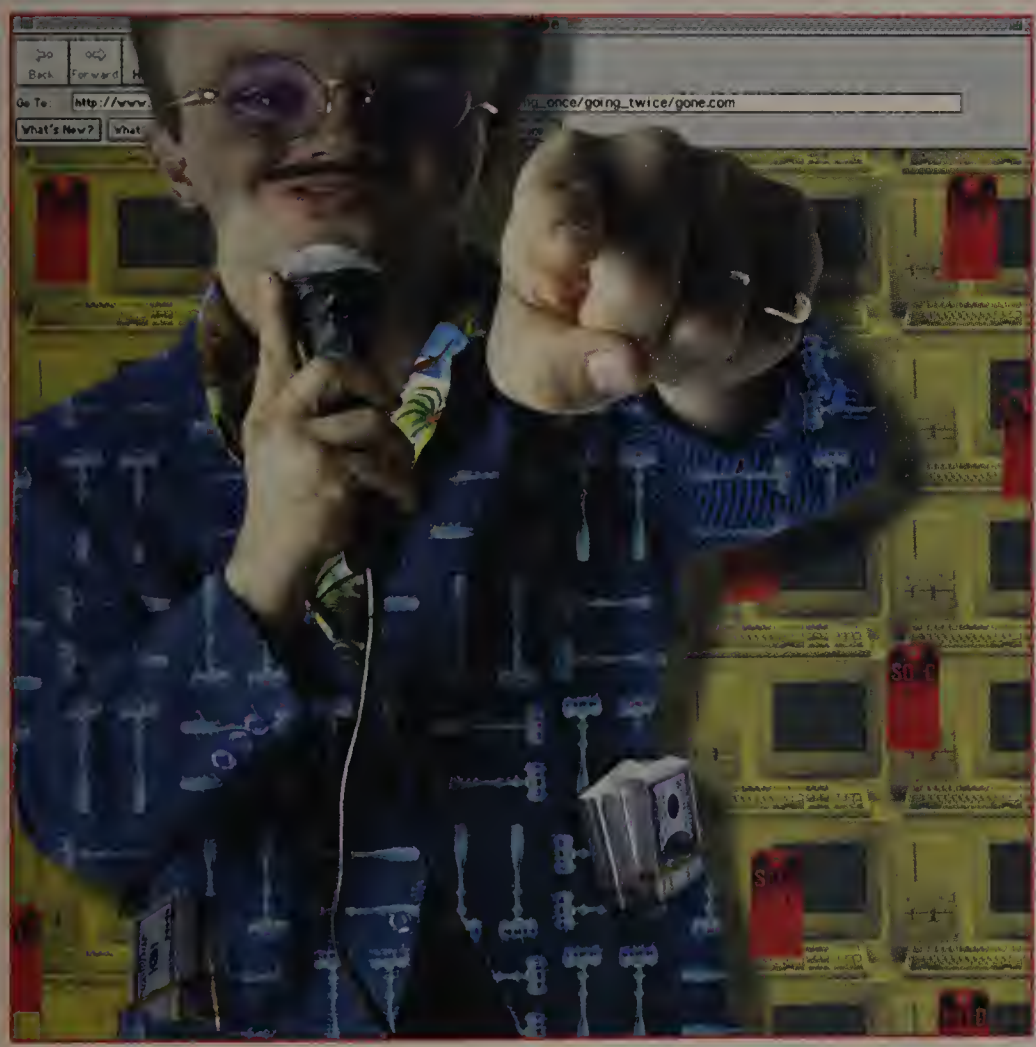

PHOTO ILLUSTRATION: LOU BEACH

PSSSST. WANT TO BUY computer hardware and software at rock-bottom prices? Looking for steep—but legitimate—discounts on name-brand equipment? Well, look no further than the World Wide Web, where online auctioneers hawk everything from high-end servers to mice and modems. It's a bargain hunter's delight—but only if you know what to look for and how to find it. Careless shoppers may wind up with more—or less—than they bid for.

Cruising an online auction is much like walking the aisles at a flea market or hanging out at a local auction house: There's a lot of junk, mixed in with a few treasures. Although you may find an occasional 56-kbps modem or 300-MHz Pentium Pro PC, most of the goods consist of refurbished equipment or out-of-date models—serviceable, but usually not state-of-the-art. If cutting edge is what you're looking for, skip the auction marts and cruise over to the Dell and Micron sites.

Since virtually anyone can start an online business, you'll need to look out for bogus or unscrupulous auction sites. But if you're careful and your needs are simple—say, a low-end notebook or an inexpensive PC for the kids—you could snag a really good deal.

If you've been to a live auction, chances are you'll feel right at home with the online variety. Like real-life auctions, online houses typically give prospective buyers a chance to preview the merchandise lots and warranty information.

AS EASY AS...

BEFORE YOU CAN place a bid, you're typically required to register (providing name, address, phone number, and payment information). After that, just click on the bid button, type in an amount, and hope for the best. Sites maintain an ongoing list of bids placed, so it's easy to keep track of the top bid.

Most sites use the time of your opening bid as the final arbiter—so if two people bid the same amount for an item, the one who put in their opening bid first wins. If you're really keen on an item, make sure to place your first bid early and then return prior to the scheduled close of the auction to see if you need to up the ante.

Though the pace is slower than at a live auction, promoters go to great lengths to pump up the excitement level. They post color photos of highlighted products on their opening screens and lure new customers to their site with unbelievably low opening bids: $9 for a Princeton 19-inch monitor, for example, or $49 for a Compaq Presario notebook. The Onsale site (www.onsale.com) features a constantly changing ticker tape at the top of the opening screen that counts off the number of bids that have been placed at the site (4,030,180 at last count—oops, make that 4,030,181). Many sites allow participants to send in a comment along with their bid and encourage everyone to "talk it up."

But online auctions aren't just fun and games. You bid real money—and if you win, your credit card is charged at once. And sometimes those "winning" deals turn into major headaches.

Over the last several months *PC World* has received a handful of letters from con- ▶

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THE RIGHT NOTEBOOK

This laptop roundup examines 14 notebooks of every type—desktop alternatives, travel mates, subnotebooks, and ruggedized portables. Plus we look at the latest Pentium II notebooks.

ALSO NEXT MONTH

▶**The PC World Top 100:** The top power desktops, budget desktops, notebooks, and home PCs, plus printers, monitors, graphics boards, and modems.

▶**Intranet-in-a-Box:** We review five easy-to-use packages that let you create a working intranet on your existing network, providing e-mail, Web page hosting, publishing services, and more.

▶**Here's How:** *Answer Line* on how to use the emergency boot disk, *Hardware Tips* on basic PC troubleshooting, *Upgrade Guide* on adding more memory.

PC WORLD

sumers dissatisfied with the service provided by various auction sites. Among the most frequently cited complaints: credit cards charged long before products are shipped, excessively lengthy shipping delays, and products delivered DOA.

Before placing a bid, get to know the policies—and the company. Avoid auction houses that don't list a physical address and a phone number, or don't supply clear information about the products or their policies. Be wary of brand-new sites, too. If there's not a lot of action or if a site seems suspect in any other way, skip it.

THE BARGAINING PROCESS

THOUGH MOST online auctions I visited followed the same format, each has its own way of presenting basic facts like product specifications, warranty coverage, and shipping times and costs. Let's look at each of these three critical areas.

Product specs: To keep prices low, online auctioneers typically buy closeout stock from manufacturers and liquidators. As a result, the types—and condition—of goods can vary considerably from day to day. Each featured item should be accompanied by specifications detailing its features, compatibility issues, and components (in the case of a PC, for example).

Study this information carefully, because you may be dealing with anything from a fully equipped PC, including monitor and bundled software, to a bare-bones unit lacking even an operating system. The specs are also where you *should* be able to find out whether the item is brand-new or refurbished—a distinction that can affect performance and warranty coverage.

Unfortunately, it's not always easy to determine the condition of the merchandise in question. On my visits to online auction sites (see "Auction Lowdown," above right), I found items described as "pulled," "like new," and "reconditioned," each term ultimately referring to products that could be sold as new. In response to consumer inquiries, DealDeal.Com added a glossary page to its site explaining what the various terms mean—a useful feature. Other sites, however, describe products as "OEM" or "brown box" units, without ever clarifying these terms.

AUCTION LOWDOWN

DealDeal.Com (www.dealdeal.com)
Membership required.
- Sales tax: For residents of Mississippi, South Carolina, Utah, Washington, and West Virginia.
- Shipping: Within 14 days.
- Comments: Auctions a hodgepodge of new and refurbished products; condition of merchandise is sometimes unclear.

First Auction (www.firstauction.com)
Membership required.
- Shipping: Within 14 days.
- Sales tax: For residents of California, Florida, Iowa, and Virginia.
- Comments: Selection is often limited to just a few items per category (modems, monitors, and so forth), but product descriptions are clear.

Onsale (www.onsale.com)
No membership required.
- Shipping: 10 to 14 days.
- Sales tax: For residents of California, Michigan, New Jersey, and New York.
- Comments: Nice mix of name-brand and no-name merchandise, all with clear descriptions of product features, condition, and warranty coverage.

USAuctions (www.usauctions.com)
Membership required.
- Shipping: 10 to 20 days.
- Sales tax: For California residents only.
- Comments: Poor selection of computer hardware, with little (and sometimes contradictory) information about product condition and warranty coverage.

The best sites, such as Onsale and First Auction, make it easy to find out all details about a product. The worst offer little—and sometimes conflicting—information. Over the course of several visits to USAuctions (www.usauctions.com), I rarely found significant product information. Once, for example, USAuctions featured seven different modems but offered details on only one.

Given the "all sales final" policy of most online auctions, I wouldn't buy from any site that didn't provide comprehensive—and consistent—product information.

Warranties: Auction products often have a shorter warranty than comparable ▶

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new items. Make sure you know the warranty period (90 days is typical); the extent of the coverage, which includes anything from simply swapping out defective hardware to providing on-site service and telephone technical support. And find out who is responsible for support. Some products come with limited support from the manufacturer; others are covered by a third party or the auction house itself.

Shipping fees and sales tax: Unlike most mail-order companies, the auction houses don't typically give buyers the option of paying extra to expedite a shipment. Since it can take up to three weeks before you receive your purchase, this isn't the way to shop if you need the merchandise in a hurry. Besides checking on shipping fees, you'll also want to find out whether you're responsible for paying sales tax.

WHAT'S YOUR BID?

ONLINE AUCTIONEERS deliberately keep opening bids low to attract buyers. But the actual selling price is always significantly higher. For example, a refurbished Pentium-200–class HP Pavilion (sans monitor) was listed by Onsale at an opening bid of $199; the winning bid was $949—nearly the price of a new unit at the time.

Before placing a bid on a product, make sure you know the street price of a comparable new item. Be careful not to get so caught up in the bidding excitement that you end up winning the auction but paying more for the item than it's worth.

If you're in the market for bargain PC equipment, you may find what you're looking for at an online auction. But don't be swayed by low prices alone. Check out the policies and the company before joining the action. Sure, it's a great feeling to be a winner and get a bargain—but only if you have some recourse if something goes wrong with what you purchased.

Have you shopped at an online auction recently? Tell us about your latest find by e-mailing consumerwatch@pcworld.com. Roberta Furger is a PC World *contributing editor. She is the author of* Does Jane Compute? Preserving Our Daughters' Place in the Cyber Revolution *(Warner Books, 1998).* ■

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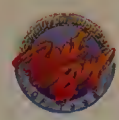

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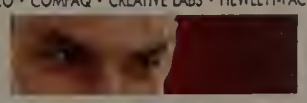

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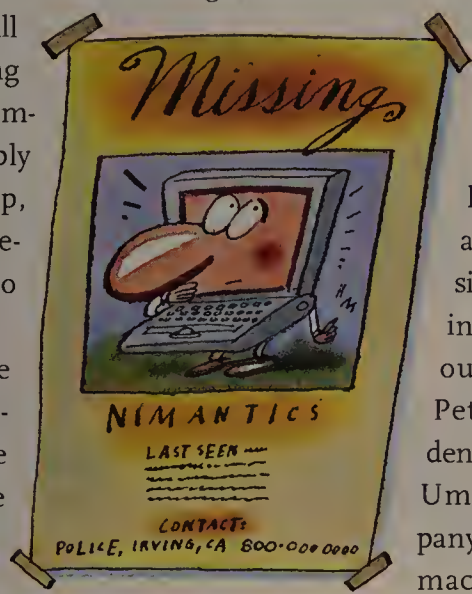
Circle 96 on reader service card

LG Electronics

Nimantics goes AWOL ◆ Umax's PC price too good ◆ Misleading Computer America ad

Laptop Manufacturer Blows Town

PCW ADVOCATE HAS RECEIVED an influx of letters from puzzled consumers who read about the Nimantics Persona subnotebook in November 1997's *New Products* and can't reach the company. Some readers bought the laptop and now can't get repairs or tech support. After making a splashy showing at Fall Comdex 97 and receiving critical acclaim for its computers, Nimantics simply packed up, closed shop, and disappeared last December, owing money to lots of people.



The company's phone lines have been disconnected, and its Web site is gone. Even the police in Irvine, California, where Nimantics was based, have been unable to locate owner Nimesh Desai or the company's inventory. If Nimantics owes you money or equipment, the Irvine Police Department would like to hear the details. Contact Investigator Dave Wills at 714/724-7183, or send a fax to 714/724-7191. Nimantics customers who paid for their purchase by credit card can, of course, contact their credit provider for protection.

ILLUSTRATION: HAL MAYFORTH

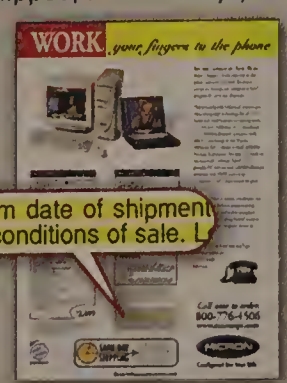
UMAX SELLS OUT

BARGAIN SHOPPERS went crazy for a Umax Pentium MMX-200 PC advertised in *PC World*'s February issue for $899. But many would-be buyers were told that the systems had already sold out. Bait and switch? No. It was a simple case of overwhelming demand for this close-out special. According to Peter Mehring, vice president and general manager of Umax Computer, the company sold about 1600 of the machines in less than two weeks—or about ten times as many as normal. The good news is that because of the huge demand for this cheap PC, Umax is launching a new bargain line of sub-$1000 computers that should be available by the time you read this. For more information, call 888/236-8629, or visit www.umaxpc.com.

THE FINE PRINT

WHEN 30 DAYS IS NOT 30 DAYS

THE (VERY) FINE PRINT in this Micron advertisement states clearly that the 30-day money-back guarantee begins the day the computer is shipped, not the day you receive it—a policy typical of most PC manufacturers. So if your new PC is in transit for three to four days or longer (if, for example, you live in a remote location), you might have only 26 days to evaluate it. And if you aren't at home or in your office to greet the delivery person the first time out, you'll have even less time to put your new computer through its paces. Return policies vary from company to company, so be sure you know exactly when the clock starts running on your PC's evaluation period.



NOT WHAT THE AD CLAIMS

RUNNING DECEPTIVE advertising is a serious accusation. But several readers were incensed enough to accuse PC component dealer Computer America of just that. The company ran ads for CPUs with very appealing prices in our January and February issues. But when readers called to order, say, a Pentium MMX-200 chip at the advertised $139 price, they were quoted a price of $209. Michael Ross, general manager for the San Clemente, California, company, explained that while prices change constantly, Computer America must prepare its print ads eight weeks in advance of publication. In both ads, Computer America failed to provide a disclaimer stating that "prices are subject to change without notice." Ross says current ads contain the disclaimer.

MAKING A BAD SITUATION GOOD

IN A TALE that speaks volumes about customer service, Brenda Hartwig of Arlington, Washington, ordered a copy of Internet Explorer Plus from Provantage (www.provantage.com), costing $49.95 with a $20 Microsoft rebate. Hartwig paid an extra $17 for overnight delivery. But she didn't receive the package for three weeks because the software was back-ordered at Microsoft. Hartwig couldn't get Provantage to refund her $17, so she wrote to me. *PCW Advocate* e-mailed Provantage asking why Hartwig had to pay for an overnight service she didn't get. To Hartwig's surprise, and mine, the company was on the phone to both of us in a matter of hours. Besides offering to refund her the $17, Provantage offered to pay her the $20 rebate she would have received if the software had shipped on time. We are both impressed with Provantage's response—and the speed with which it turned a bad situation into a good one.

Think you've gotten a raw deal—or a great one? PCW Advocate *wants to hear the details at advocate@pcworld.com. We'll investigate complaints and publish items of the broadest interest. Christina Wood is a contributing editor for* PC World. ■

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Matrox outperforms the competition	
Matrox Productiva G100 8MB ($99)	122
ATI XPERT@Work 8MB ($179)	97
Diamond Viper V330 4MB ($182) - N/S	
#9 Fx Reality 334 4MB ($114) - N/S	

Since its new MGA-G100 graphics chip is optimized for Windows, Ellen gets the fastest 2D acceleration in the industry, and support for today's 3D and video-based business applications. Productiva G100's 8MB of memory secures unparalleled display quality. In fact, even at 1600 x 1200 resolution, viewing true color documents or multiple windows is a breeze. And with hassle-free unified driver support for all of today and tomorrow's major operating systems, she's got reliable performance across the board.

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*Estimated Street Prices accurate at time of printing. All tests conducted by Matrox Graphics Inc. using a Dell Pentium II 300Mhz with 64MB of RAM and 512K cache. Matrox Productiva AGP was tested with 8MB of memory using driver revision 3.82. ATI XpertIdWork AGP was tested with 8MB of memory using driver revision 4.10.01.2278. Diamond Viper V330 and Number Nine 9Fx Reality 334 were tested with 4MB of memory and using driver revision 4.10.01.0022 and 4.10.1102 respectively. WinBench 98 Business tests conducted at 1280x1024@24bit at 75Hz refresh using small fonts under Windows 95 OSR2.

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LG Electronics

Put a Little Zip Back Into Your PC

Is your PC slowing down? As writer Orrie Frutkin learns, it may just need a good spring cleaning.

PHOTOGRAPH: JOHN ABBOTT

PROBLEM *Your PC takes longer to start and run programs.*

SOLUTION *Clean out more files you don't use, sweep up your system tray, and get your hard drive into shape.*

FOR A WHILE, ORRIE FRUTKIN wasn't sure if his problem was in his mind or in his computer. "When I first upgraded to a 200-MHz Pentium PC in August 1996, it seemed incredibly fast," recalls Frutkin, a marketing communications writer in Port Washington, New York. "But after a year of heavy use, of installing and uninstalling programs, my PC didn't seem to have the old zip. I wasn't sure if I had just gotten used to the speed, or if the PC was slowing down.

Guess what, Orrie? Your PC *was* slowing down. But the good news is, in most cases a series of routine cleaning chores can restore the system to peak speed.

The first rule of any good spring cleaning is to get rid of stuff you no longer use. "Windows 95 Headaches (and How to Cure Them)," in the March issue, identifies several types of files you can safely toss in the dumpster. But there's always more to purge. Take fonts, for instance.

"If you've ever loaded a desktop publishing program of any kind, chances are you've got lots of fonts installed that you never use," says Tony Magill, director of development for Symantec's Norton Utilities 3.0. Windows automatically opens all installed fonts each time it starts up so that it can load them into memory when needed. And the more fonts you have, the longer it takes to open them all.

To see a list of the fonts installed in your system, go to *Start•Settings•Control Panel•Fonts*. Double-click on any font in the list, and a pop-up window will display it in all its variations. If you don't need the font, right-click on its name and select *Delete*. Just be sure that you're not removing a system font that Windows 95 requires for its operations, such as MS Sans Serif. The Windows 95 system fonts have a big red *A* over the file icon.

UNPLUG SOME PLUG-INS

ONCE YOUR FONTS are in order, tackle your Web plug-ins. Because they take up disk space and can slow down your browser, get rid of plug-ins you don't use. In Netscape Navigator 4.*x*, select *Help•About Plug-ins*, and you'll see a list of all your installed plug-ins, their file names, and their locations on your hard drive. Follow the trail, and delete the ones that you don't need. In Internet Explorer 4.*x*, you need to manage your ActiveX controls. To find out what controls you have installed, launch Windows Explorer, go to *C:\Windows•Downloaded Program Files*, and right-click any ActiveX icon. Select *Properties* to get the scoop on taking control of your controls.

Finally, empty your system tray. What the heck is that? It's the little box with the miniature icons in the lower-right corner of your Win 95 desktop. Each icon represents a running application. Some of the programs may need to run nonstop, like an antivirus monitor that's always scanning for viruses. But other programs may not need to run all the time. ▶

Instead of keeping superfluous programs running, you can remove them from the system tray and then simply launch each one when you need it. To find out what an icon does, double-click it. To remove a program from your system tray, select *Start•Settings•Taskbar* and choose the *Start Menu Programs* tab. Then click the *Remove* button and open the *Start Up* folder. Highlight the name of a program that doesn't need to be running continuously, and click *Remove*.

CARE FOR YOUR HARD DRIVE

KEEP YOUR HARD DRIVE in tip-top shape, which means scanning it for errors and defragmenting it. (For more on this fitness regimen, see "The Complete Troubleshooting Guide," October 1997.)

When Windows 98 comes out, it will have a better defragmenter than the one in Win 95, says Shawn Sanford, a Windows product manager in Microsoft's desktop operating systems group. It will also have a Maintenance Wizard that sweeps your computer of unnecessary files and cleans out your browser's cache, temporary files, old installation files, and more.

While you're waiting for Windows 98, keep a couple of additional tips in mind. If you've compressed your hard disk using a tool like Win 95's DriveSpace, consider decompressing it. A compressed drive is a slower drive. Just make sure it has *enough space* to hold the uncompressed data.

Also, don't fill the hard drive to capacity. Your swap file should always be at least twice the size of your system's RAM so that the drive doesn't thrash continually. And heaven help you if you're trying to save a big document and get a message that you've run out of disk space. As insurance against running your PC into a brick wall, create a large file that you can delete when your drive is overloaded: Take a word processing document and embed several large images. When the disk is almost full, delete this file to free up space and then concentrate on cleaning out some of the nonessentials mentioned above.

For his part, Frutkin now defragments his hard drive once a week and uses Norton Utilities to find and delete duplicate files. He says these measures have helped, but he's still not happy with his PC's performance. If nothing else works, Frutkin says, he'll have to contemplate the ultimate solution: reformatting his hard drive and reinstalling all his files and applications (see *@Home Office*, February).

That's an option well worth considering, says Magill. "Starting from scratch can really make a difference. It's the only way I know to completely clean up and begin anew. It's a big job, but sometimes you've got to wipe the slate clean and start again."

James A. Martin is a contributing editor for PC World. *If you're having trouble resolving a PC-related hardware or software problem, we'd like to hear about it. See page 14 for contact information.* ■

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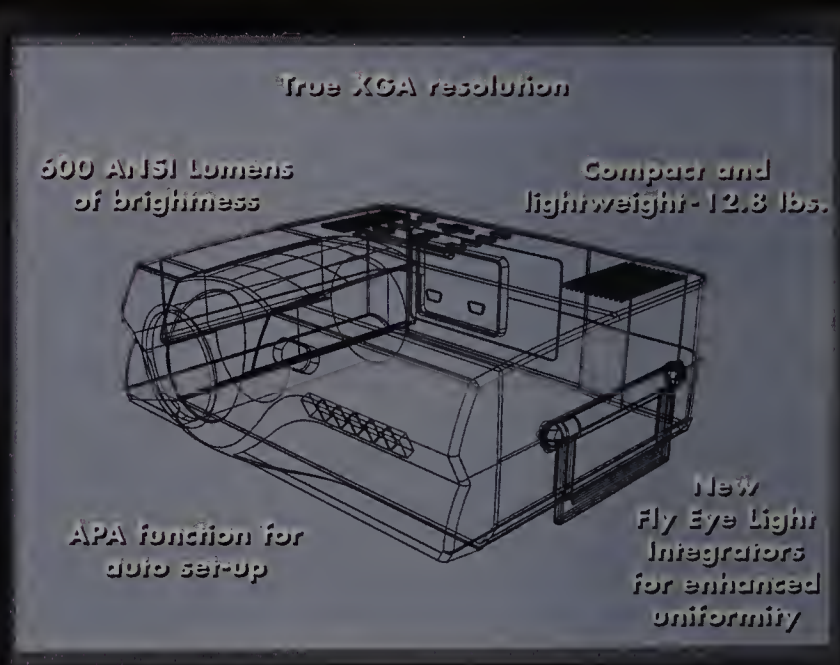
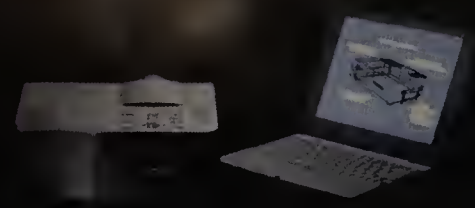


We both know it's what's inside that counts.



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May your Zip RIP ◆ Instant Messenger of doom ◆ (Not very) Funny Money 98

Zip Drive Death Click Is for Real

IT STARTED AS a dark rumor, then built into a groundswell of gripe. Now, the truth is out: Thousands of Iomega's popular Zip drives have developed a fatal condition called the Click of Death (destined to replace the Clunking Caviar in your personal mythology). COD occurs when the drive's read head becomes misaligned, leaving it unable to find the Zip disk's first track. The result is multiple clicks as the read head mechanism reaches the end of its range. Not only are misaligned drives unusable, but they can wreck good Zip disks you insert into them. (Single clicks when you insert or eject a Zip disk into a drive are normal.)

Iomega reports that the problem affects fewer than 1 percent of the more than 12 million Zip drives it has sold. But that's still tens of thousands of drives. The good news: The company will replace defective Zip drives under the one-year limited warranty, or disks under the limited lifetime warranty. The bad news: If the problem shows up after a year, you're on your own. An Iomega spokesperson claims the problem will appear within the first year.

Iomega's Web site (www.iomega.com/support/techs/zip/2135.html) offers practical guidelines for diagnosing COD problems. If you think your Zip drive is clicking your disks and making them die, hide any disks containing valuable data and try reading another disk in the drive. If it works, the problem is probably with the first disk. If the drive clicks away on several disks, the trouble is likely with your drive. Call Iomega tech support at 888/446-6342, or fill out the return merchandise authorization request form at www.iomega.com/support/techs/zip/101.html.

AOL'S INSTANT (INSECURITY) MESSENGER

LIKE THE BUFFER-OVERRUN flaws recently exposed in Internet Explorer 4.0, America Online's original Instant Messenger chat program is vulnerable to hack attacks. Specifically, a knowledgeable (and malicious) user can send a message that causes Instant Messenger to crash. The bug was discovered by a 14-year-old in Tampa, Florida. In late February, America Online posted an updated version of the program (at www.aol.com/aim/home.html) that closes the security hole.

MONEY 98 IN A STATE

I KNEW Money 98 had some problems, but I didn't expect to encounter more than 100 Microsoft Knowledge Base documents describing irritating glitches and workarounds. Among them:

- The program is incompatible with CyberMedia's First Aid, Network Associates' PC Medic, Quarterdeck WinProbe95's Crashshield, and Symantec's Norton Crash Guard.
- Tax Worksheet miscalculates tax liability and may apply the maximum capital gains rate even when there is a capital loss.
- Addresses are printed incorrectly on checks after a data file is converted from a previous version.
- The Bill Reminder icon doesn't show up in Windows' system tray, even if you have transactions due.
- The Monthly Report displays inaccurate investment gain and loss percentages.
- Bills managed by the Debt Reduction Planner don't show up in the upcoming-bills list or in the Bill Reminder.
- The program may not find checks that need to be printed, or it may report that checks need to be printed when none do.

An 82KB patch available at support.microsoft.com/download/support/mslfiles/mspfctlx.exe corrects Money's clashes with third-party utilities. A 128KB patch fixes the check-printing problem; for installation instructions and a link to the patch, see Knowledge Base article number Q179667 at support.microsoft.com/support/kb/articles/q179/6/67.asp. Finally, if you've had it with the product tour that runs every time you launch Money 98, get the 75KB utility that shuts it off at support.microsoft.com/download/support/mslfiles/touroff.exe.

Files from this article are available on PC World Online at www.fileworld.com. Scott Spanbauer is a senior associate editor for PC World. ■

IN BRIEF

Norton Utilities 3 LiveUpdate 3

LIVEUPDATE 2 didn't solve all of NU3's troubles. Find the 1.41MB LU3 at ftp.symantec.com/public/english_us_canada/products/norton_utilities/ver3_win95/updates/NU3-LU03.EXE.

Word 97 Grammar Checker Fixed

WORD 97 CHOKES on certain long, convoluted sentences (lawyers, beware). To solve the problem, you need a 629KB fix available at ftp.microsoft.com/softlib/mslfiles/gramupd.exe.

Windows NT/Zip Disk Clash

WINDOWS NT 4.0 mistakes ATAPI-capable drives for floppies, making them inaccessible. The fix is at ftp.microsoft.com/bussys/winnt/winnt-public/fixes/usa/nt40/hotfixes-postSP3/zip-fix/zip-fixi.exe.

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TOP OF THE NEWS

Intel's Celeron 266

Cheap! But Will This Fledgling Fly in Sub-$1000 PCs?

PHOTO ILLUSTRATION: JEFF BERLIN; ICONS: JEFFREY PELO

EXCLUSIVE

YOU HAVE PROBABLY noticed the proliferation of astonishingly low-cost yet capable PCs. But have you also noticed that a surprising number of these sub-$1000 systems do not sport the "Intel Inside" logo? Intel hopes that will start to change on April 15, when the company introduces the Celeron, a stripped-down Pentium II–class chip aimed squarely at the fast-growing market for entry-level PCs.

First tests show disappointing performance by Intel's offering for entry-level PCs. Cyrix- or AMD-based systems may offer better values.

The good news is that continued competition at the high and low ends of the market will force manufacturers to slash prices and push performance even further. The bad news: The Celeron itself falls short of the mark.

The new chip, whose name is based on the word *celerity* (a fancy synonym for speed), will be rushed out of the factory to counter cheap CPUs from rival chipmakers Advanced Micro Devices, Cyrix, and Centaur. But the PC World Test Center's first road test of the processor indicates that Intel's rivals are still ahead. Simply put, the Celeron fails to live up to its name.

PC World obtained a preproduction PC expected to sell for under $1000 and built around a 266-MHz Celeron with 64MB of system memory and an 8MB video card. We measured it against a range of systems—some with less main memory—and found that the Celeron's performance on business applications didn't match its high clock speed.

CELERON TANKS

THE TEST SYSTEM (whose manufacturer asked to remain anonymous) earned a PC WorldBench 98 score of just 106. Similarly configured PCs using AMD's 233-MHz K6, a chip widely available in $999 systems, posted an average score of 126. The Celeron system's performance on business applications was worse than that of low-price Cyrix-based systems and systems running on the chip the Celeron is meant to supplant—Intel's Pentium MMX-233, which can be found in PCs costing $1100. In fact, the Celeron couldn't keep pace with PCs running on a chip used in systems that cost as little as $799—Intel's PMMX-200.

In fairness, note that our tests were conducted on one early Celeron-based system. The chip was close to the final version, but sources close to Intel say the final version of the chip may offer "slightly" better performance. Nevertheless, PC vendors privately express little enthusiasm over the new chip's performance.

Celeron's anemic debut is good news for Intel's rivals, and paradoxically it may be good news for consumers, too. The reason: AMD, the largest of the alternative CPU suppliers, badly needs some breathing room. "It's the fourth quarter, and they're down 20 points," says analyst Drew Peck of Cowen & Co. If AMD doesn't start making money fairly soon (it's been in the red during much of the past two years), Intel could have most of the playing field to itself. And how generously will it treat consumers at that point?

ANYBODY HOME?

INTEL RARELY misses an opportunity, but sub-$1,000 PCs were a glaring exception. A year ago, chips like Celeron weren't even on the company's road map, admits CEO Andy Grove. That's because Intel, a company accustomed to high profit margins, wasn't interested in producing cheap chips for cheap PCs.

Things change. Roughly 32 percent of all desktop PCs sold via retail between October and January cost less than $1000 without a monitor included, according to market research firm Computer Intelligence. If you stretch the category to $1050, the number jumps to about 40 percent, says CI analyst Matt Sargent.

What were the CPUs that powered all those low-end computers? By and large, they ▶

EDITED BY
Charles Piller, Randy Ross, and Bill Snyder

JUST IN

WordPerfect 8 Fire Sale

COREL IS SLASHING the price for upgrading to its WordPerfect Suite 8. Corel will sell the latest competitive upgrade of WordPerfect Suite 8 and WordPerfect Suite 8 Professional for $89 and $179, respectively, down from $179 and $249.

Check E-Mail Without Logging On

TIRED OF BOOTING your PC and dialing up your ISP every hour to check for new e-mail? Casio's $149 PhoneMate IT-380 E-Mail Link, slated to ship by summer, is a telephone and answering machine that can dial two ISPs at intervals of your choosing and download header information from new messages. The headers—which include the subject, sender, and time the message was received—are displayed on a 3-line LCD screen. You'll still need a PC to read the mail.

Design Your Own Notebook

BY THIS FALL, Fujitsu will offer a build-to-order option for some products in its LifeBook line of notebook PCs. You'll be able to order a notebook from a dealer and specify a CPU, pointing device, screen size and type, plus such optional items as a CD-ROM drive, a second hard ▶

INTERNET

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COMPETITION OUTGUNS INTEL'S CELERON

SYSTEMS	RAM (MB)	Secondary Cache (KB)	PC WorldBench 98 score
Celeron-266 PC	64	0	106
AMD K6-266 PC	64	512	145
Average of 3 Pentium II-233 PCs	64	512	138
Average of 2 Cx6x86MX-PR233 PCs	32	512	127
Average of 4 AMD K6-233 PCs	32	512	126
Average of 2 Pentium MMX-233 PCs	64	512	123
Average of 5 Pentium MMX-200 PCs	32	512	109

HOW WE TEST We tested All systems with PC WorldBench 98, PC World's application-based benchmark. A higher PC WorldBench 98 score is better. For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/benchmark). Data based on testing conducted by the PC World Test Center. All rights reserved.

were Intel's older Pentium chips and Pentiums with MMX—although not in the numbers you might expect. The combined market share of AMD, Cyrix, and Centaur is about 15 percent of units sold; but among sub-$1000 PCs, it increases to 22.8 percent, says analyst Dean McCarron of Mercury Research.

RADICAL REDESIGN

INTEL REALIZED its mistake months ago, but finding a recovery strategy hasn't been easy. Not only is designing chips exceedingly difficult, but Intel got caught in the midst of moving its entire product line from the familiar pin-and-socket arrangement to a more complex (and proprietary) set of cartridge-based designs.

The new arrangement—called Slot 1 and Slot 2, and first used by the Pentium II—mounts the CPU and chip set on a card inside the cartridge.

Observers disagree about why Intel adopted this design. Intel and some analysts contend that Socket 7, the old Pentium arrangement, is a barrier to increased system performance. Skeptics say Socket 7 had plenty of life left and suggest that the main reason Intel moved to Slot 1 was to make life difficult for the competition—which it did.

Locked out of Slot 1 by a web of patents, AMD and Centaur (Cyrix has the right to license Slot 1) find themselves in the uncomfortable position of having to depend on a shrinking universe of motherboard and chip-set makers willing to support Socket 7. And they have to convince PC makers that supporting two different basic designs is worthwhile.

The Other Investigation: The FTC Takes on Intel

MENTION "ANTITRUST" or "monopoly" and one computer industry behemoth springs to mind: Microsoft. But another technology company is also receiving serious government scrutiny, and the outcome of that case will be every bit as significant to consumers.

The other company is Intel, of course, and the agency investigating the world's largest semiconductor maker is the Federal Trade Commission.

Insiders say the investigation announced in September actually began in late 1994. "It's the single most important and pressing investigation on the agency's agenda," says Art Amolsch, editor of *FTC:WATCH*, an industry newsletter. Knowledgeable sources say the investigation now extends far beyond the immediate question of whether Intel's pending acquisition of Digital's semiconductor business is permissible. And they don't expect the FTC to decide what to do until late this year.

In essence, the FTC suspects

Intel All Over Your PC

Intel's share of the market[1]

[1]Figures are for 1997, except the CPUs segment, where figures are for 1996. [2]Source: Dataquest. [3]Source: In-Stat. [4]Share of units is about 85 percent.

ENTER CELERON

WHATEVER ITS motives, Intel is putting all its new generation of desktop chips into Slot 1 or Slot 2. But the elaborate cartridge makes the Pentium II somewhat more expensive to produce than a Socket 7 chip. On mainstream desktops it's not a problem, but buyers of the "Basic PC" (as Intel now calls entry-level machines) are highly price conscious. So PC makers have to save every possible manufacturing dollar.

"Intel could have made a more compelling entry-level chip by using Socket 7 design," says Mercury Research analyst Mike Feibus. But that would have breathed life into the old architecture, which Intel is loath to do.

Enter Celeron. In essence, Celeron is a 266-MHz Pentium II whose cartridge fits into Slot 1. But to save money, Intel removed the outer package and dispensed with the original chip's secondary cache. That will allow Intel to sell the chip to computer vendors for $155 when it ships in volume this spring, compared to the current price of $375 for a true 266-MHz Pentium II. But there's a trade-off.

Removing the secondary cache, which is **what Intel did to the Celeron,** saves costs, but without it, system performance drops dramatically.

Secondary cache is an extra bit of memory outside the core of the chip. Composed of chips faster than those in main memory, it gives the CPU a place to look for data before having to search in main memory. Without the cache, system performance drops dramatically.

PC World has not tested the Celeron chip on multimedia tasks such as sound, graphics, and video. Intel says that its performance in those areas should be better than its performance on business applications because the chip retains design features that make the Pentium II a strong multimedia choice.

Celeron buyers shouldn't plan on upgrading a Celeron system to a standard Pentium II, however: The Pentium II cartridge won't fit on the motherboards that will ship with most Celeron PCs.

Meanwhile, AMD ap- ▶

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something that has been whispered in the industry for years—that Intel withholds CPUs or refuses to give equal price breaks to PC makers who dare to buy from Advanced Micro Devices or Cyrix. Why should you care? If unfair practices squeeze out the competition, Intel will lose much of its current incentive to cut prices and rush new technology to market.

Intel vigorously denies engaging in the obviously illegal practice of withholding CPUs from companies that "second-source." And indeed, some large and small PC makers buy from both Intel and its competitors, yet still get a share of the Intel Inside marketing pie.

Because Intel's market share is so large, its actions profoundly affect the industry. The FTC believes Intel may use its dominance to set de facto technical standards that hamstring the competition.

For example, Intel's attempt to move the industry to its proprietary Slot 1 architecture (see main story) clearly makes it much harder for PC makers to put non-Intel chips inside their PCs.

MANIPULATING THE MARKET?

THE FTC IS ALSO investigating charges that Intel:

- Withholds crucial technical information from companies that buy from competitors or that challenge Intel in court.
- Used its commanding lead in CPUs to enter and then dominate new market segments (see chart) such as graphics chips, thereby strengthening its hold on the microprocessor market.

Despite the rumors, it's nearly impossible to extract a concrete example of an unfair business practice from anyone who works for a PC company. Says a former Dell executive: "Everyone assumes you'd lose your special relationship with Intel by buying from a competitor. But did I ever hear that said directly? No."

One person who will discuss the situation is Mike Feibus of Mercury Research. As Slot 1 approaches the status of a standard and Intel integrates more functions into its CPUs and chip sets, the outlook for the competition will get bleaker, he says. "Intel has its hotels on Boardwalk and Park Place. The FTC may be the last hope."

—Bill Snyder

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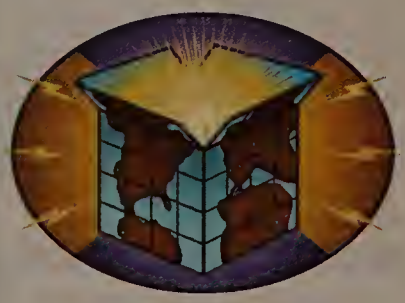
drive and battery, and a floppy disk drive. By the end of the year, Toshiba also will offer a build-to-order option on some of its notebooks, according to a company spokesperson.

Turn on the Jacuzzi, HAL

HAL2000, a $399 program from Home Automated Living (www.automatedliving.com) enables your PC to control electrical appliances, heating and security systems, and entertainment devices in your house. Each device requires a $10 module that plugs into the wall. A voice interface allows you to issue commands over the telephone or through a PC microphone.



Tidbytes

Windows 98 Goodies: Microsoft will offer a plus pack for the upgraded OS that includes an enhanced collection of themes and games; McAfee VirusScan; a file cleaner that marks noncritical files for removal; and an archive tool that permits users to drag and drop, view, and run files from a compressed folder. At press time, the package's price had not yet been announced. **A Better Internet Phone:** Quicknet Technologies' Internet LineJack is an add-in card that lets you plug a normal phone into your PC and make calls either through your regular carrier or over the Internet. The product also provides three-way calling. We found LineJack easy to use. It is expected to ship in June for about $300.

pears close to solving the manufacturing problems that prevented it from shipping many of its K6-266 processors, says Ashok Kumar, an analyst with Piper Jaffrey. If so, its strategy just might succeed. "We'll position the K6 [chip family] to go head to head against Celeron," says Dana Krelle, AMD vice president. Even the company's fastest current processor, the K6-266, which offers much better performance, won't be priced any higher than the Celeron; and slower versions of the K6 will be priced at about 25 percent below Intel's best price, Krelle says. By the middle of the year, AMD expects to roll out a new chip to compete against mainstream Pentium IIs: the K6-3D, which will debut at 300 MHz. Its speed could hit 400 MHz by the end of the year, he says.

> Intel already has a successor to the Celeron in the works. **Mendocino is expected to run at 300 MHz** when it debuts late this year. One analyst calls it "dynamite."

Cyrix, now part of National Semiconductor, will keep building highly integrated versions of its low-cost MediaGX chips, pushing them into the lowest end of the market. "Our target is a $599—and maybe lower—PC by Christmas," says Cyrix VP Steve Tobak. At the same time, Cyrix will continue to compete with the PII by upping the performance of its mainstream chips. It expects to introduce its fastest chip ever—a 6x86MX-PR300, priced at about half Intel's Pentium II-300—sometime this spring.

Not surprisingly, Intel already has a successor to the Celeron-266 in the works. Code-named Mendocino, it is expected to run at 300 MHz when it debuts late this year and will cost about the same as the current Celeron. Significantly, it contains an on-chip secondary cache that could make it a winner. "Mendocino is dynamite," says Dataquest analyst Nathan Brookwood.

And even as the battle for the low-end consumer market unfolds, Intel and its competitors will be fighting on a second front—high-end systems equipped with a 100-MHz system bus. So the stage is set for a crucial battle. If AMD and Cyrix actually deliver the products on their road maps, the outcome could be a big win for consumers. If not, only the paranoid may have survived.

—Bill Snyder

AOL Rate Hike Ignites Internet Service Price War

CONSUMER ALERT

INTERNET USERS everywhere should be breathing a collective sigh of relief. By the time you read this, America Online—with 11 million subscribers, the king of the ISP hill—will have raised its monthly subscription rate from $19.95 to $21.95. In the wake of the announcement, many observers expected competitors of all sizes to quickly follow suit, raising the price of Net access for everyone.

But that's not what happened. In fact, since the AOL rate hike, most ISPs are holding fast to the magic $19.95, some have even lowered their monthly rates, and many are aggressively pursuing what the industry calls AOL graduates: online users who learned to surf in AOL's placid waters and who are now looking for faster, cheaper, and more reliable Net access.

This heated competition is a boon for online consumers. Shop around, and you can find Internet access for well under $19.95 per month—particularly if you spend a limited amount of time online or if you're willing to pay for a year up front.

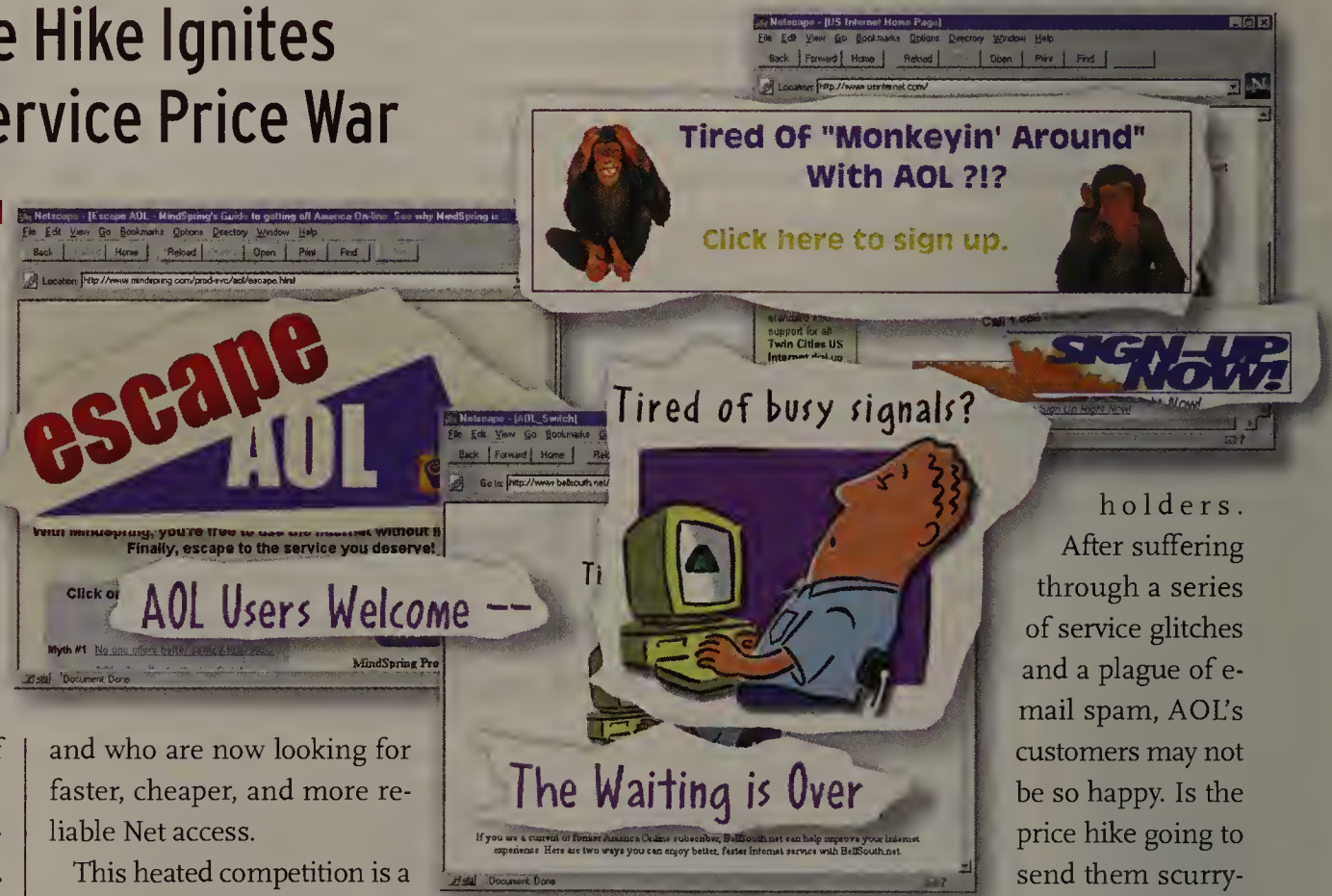


PHOTO ILLUSTRATION: JEFF BERLIN

AOL'S MOTIVE: PROFIT

THE $2 RATE HIKE was just one of several profit-enhancing moves AOL announced in February—steps that boosted the company's stock price substantially, delighting shareholders. After suffering through a series of service glitches and a plague of e-mail spam, AOL's customers may not be so happy. Is the price hike going to send them scurrying for less-expensive, more-reliable alternatives?

In most cases, probably not. For one thing, access has improved. In January 1997, according to Inverse Network Technology, fully 80 percent of attempts to dial in to AOL

modems failed. By December, that rate had dropped to 16 percent—still twice the 7.9 percent average for ISPs, but a big improvement. (Not that everything is rosy: Two weeks after the price-hike announcement, AOL's e-mail system suffered several of its not-infrequent glitches.)

In any case, says Forrester Research analyst Kate Delhagen, the inconvenience of changing providers is likely to keep loyal users from fleeing AOL. "They have a captive audience, millions of people locked in by Buddy Lists and patterns of usage. All the hassle—forwarding e-mail, changing Buddy Lists, relearning—may not be worth saving two bucks a month."

Furthermore, AOL may not mind losing a few customers if the end result is improved service for everyone else, say some observers. "If you have more business than you can handle, raise your price and wean price-sensitive people away," says Lee Thurburn, CEO of ISP FlashNet Communications in Fort Worth, Texas (www.flash.net). "The user-to-modem ratio goes down, and the quality of service goes up," says Thurburn. "It's a smart move."

RECRUITING THE REFUGEES

IT'S ALSO A business opportunity for Thurburn. FlashNet has introduced a monthly rate of $16.95, available in most major cities. Pay one year in advance, and the price drops to $13.95 per month.

FlashNet is just one of many ISPs that are hoping to recruit erstwhile AOLers with lower rates and the promise of better service. EarthLink (www.earthlink.net) has launched the "Get Out of AOL Free" program, in which the company waives its customary $25 sign-up fee for AOL deserters.

> FlashNet and other ISPs are hoping to **lure erstwhile AOLers** with lower rates and the promise of better service.

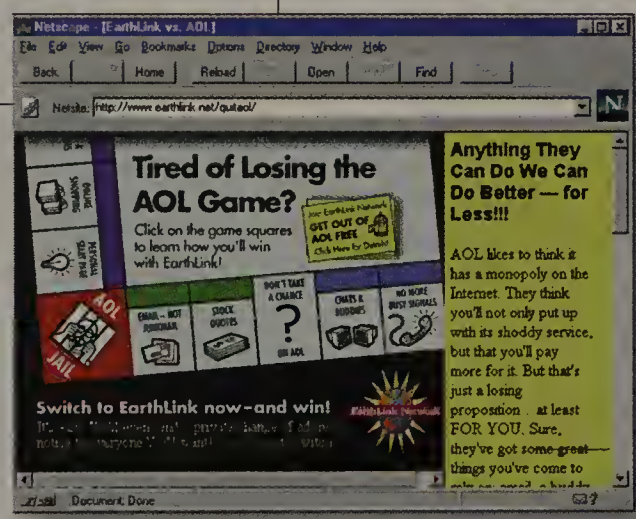
From MindSpring, (www.mindspring.com), an "Escape AOL" campaign offers a similar deal. US Internet (www.usinternet.com) will also waive its sign-up fee for customers leaving AOL and provides an automatic change of e-mail address, not to mention a catchy phone number to call: 888/LEAVE-AOL.

TELCOS' LONG-DISTANCE LEVERAGE

TELEPHONE COMPANIES offering Net access are using similar tactics. Hit the AOL Users Click Here button on BellSouth.net's home page, for example, and you can read all about the company's Net service—$19.95 per month for unlimited access, or $9.95 per month for 10 hours.

The BellSouth recruitment campaign also lets potential customers in on a little secret: You can sign up with any ISP and still get access to America Online's proprietary content for just $9.95 per month, thanks to AOL's "Bring Your Own Access" program (see AOL keyword byoa).

MCI is leveraging its other businesses in an attempt to lure Internet subscribers. The company lowered its monthly unlimited Net access rate from $19.95 to $14.95. The catch: Only MCI long-distance customers get the discount; everyone else pays $19.95. "Many of our Internet and long-distance customers also purchase MCI cellular and paging services," explains spokesperson Brad Burns. "So profitability at $14.95 isn't even an issue." AT&T is sticking with its $19.95 rate. "We introduced $19.95 fixed pricing two years ago," says AT&T WorldNet representative Mike Cady. "We believed then that it could be profitable, and we still feel that way."



EARTHLINK'S "Get Out of AOL Free" program waives the ISP's customary $25 sign-up fee.

A few ISPs are joining AOL on the road to higher access fees. Shortly before the AOL announcement, IBM Internet Connection Services amended its rate plan, charging $19.95 a month for up to 100 hours, $1.95 per hour after that. And EarthLink has announced a new "Total Access Gold" program: Pay $9.95 per month on top of the $19.95 flat fee, and you receive priority technical support, free automatic software updates, and a second e-mail account.

WARNING: SHAKEOUT AHEAD?

AS NATIONAL providers add more local dial-up numbers, and more phone companies adopt strategies like MCI's and BellSouth's, mom-and-pop ISPs may find it harder to survive—especially when they stick with the $19.95 rate. "Profit margins are very slim in this industry," says Julia Pikar, an analyst for Zona Research in Redwood City, California, "and many ISPs are having a hard time making money."

But Bill McCarthy, editor of *Boardwatch Magazine*'s directory of Internet service providers (www.boardwatch.com), points out that ISPs large and small are offsetting low access rates with income from premium services such as 56-kbps access. He believes that "small-town and local urban ISPs willing to provide an extra measure of customer service still have a lot of opportunity." Donna Lachance, vice president of marketing for BellSouth.net, agrees. "Little ISPs are growing quickly by providing hand-holding and moving into services such as Web hosting and design."

AOL's price hike could give ISPs of all sizes a shot in the arm. As BellSouth.net's Lachance puts it, one Goliath is an easier target than all the Davids of the industry. "We don't target any competitor in particular," she says, then pauses. "Except AOL."

—Jim Heid ▶

New Lotus SmartSuite Millennium—Practical, Not Pioneering

B E T A

THE GREAT Feature War in office suites is finally over. After years of bombarding us with new capabilities that many people never used, vendors are calling a truce. Revolutionary features will no longer be a major focus. Instead, the main suite vendors—Microsoft, Corel, and Lotus—say they plan to offer suites that are easier to use, faster, and more practical.

MODEST UPGRADE

LOTUS IS THE FIRST to fire up the peace pipe with its new SmartSuite, dubbed SmartSuite Millennium Edition, slated to ship by the end of June. Though it is a modest upgrade, and though many of the promised improvements were not available in the preproduction version that I reviewed, current SmartSuite customers and even some users of Microsoft Office and Corel's WordPerfect Suite will want to give it serious consideration.

Among its slicker features are a new Web creation tool and a feature for importing and exporting files that facilitates swapping documents with Office users. Key Lotus applications such as 1-2-3 and Word Pro have been tweaked to make them easier to use. Lotus also claims that it will enhance the suite's performance, particularly in the critical areas of application loading and file printing. The Millennium Edition's price wasn't available at press time, but it will likely be comparable to the existing SmartSuite 97's $399 list price ($149 for upgrades). A full installation will require 180MB of disk space—about 10MB more than Millennium's predecessor required. That's still somewhat smaller than Office 97, which demands 191MB.

NET-NEIGHBORLY

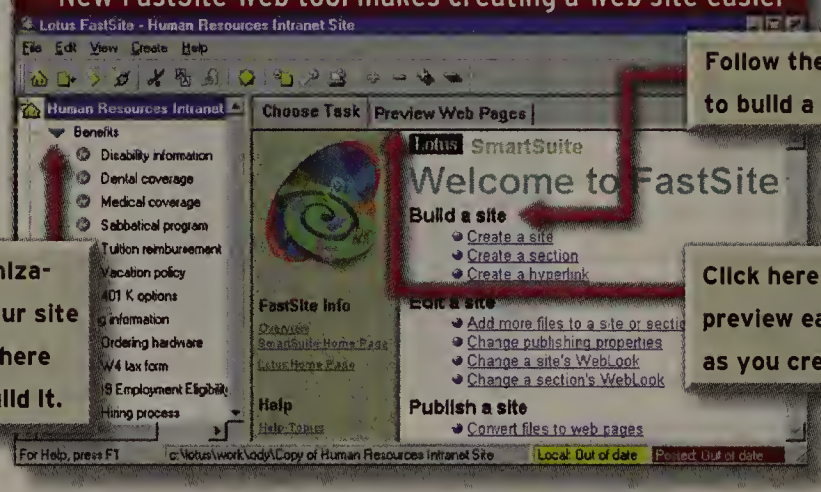
The new FastSite tool lets the average PC user create, edit, and publish Web pages. It's ideal for anyone who has to update a department's intranet site but doesn't want to learn a full-blown Web-authoring package such as Microsoft FrontPage. I found FastSite considerably easier to use than FrontPage.

Here's how FastSite works. To create a new Web page, you select a template and choose the files you want to include. FastSite then converts the files to HTML. In a few minutes, I had constructed a complete Web site ready for an Internet or intranet server.

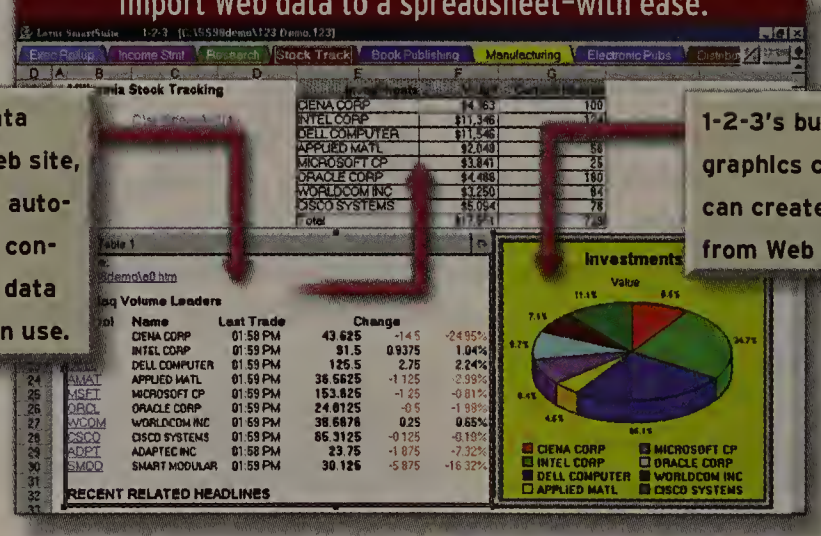
FastSite is not designed to meet the needs of Webmasters, so it lacks some of the key features in full Web-authoring programs. The tool's predesigned page templates, for example, are pretty basic.

Lotus also added another nice Web publishing feature: All Millennium Edition applications enable you to convert documents into a file format called JDOC that any browser can view. Why is this a big deal? Prior versions of SmartSuite allow saving files in HTML, but you sometimes lose formatting in complex documents such as large spreadsheets or databases. Files that are stored in JDOC leave all formatting and graphics intact. JDOC also offers a key advantage over another popular portable document format, Adobe Acrobat. Any browser with built-in Java support, such as version 3.0 and above of both Microsoft Internet Explorer and Netscape ▶

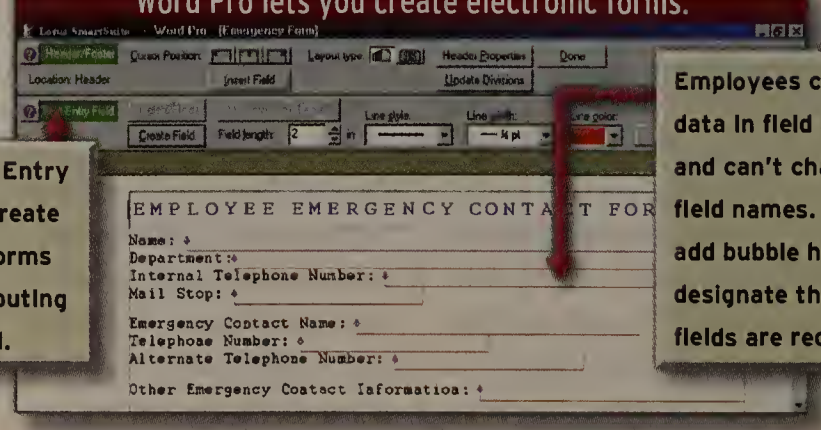
New FastSite Web tool makes creating a Web site easier



Import Web data to a spreadsheet-with ease.



Word Pro lets you create electronic forms.



New Eudora Pro CommCenter 4.0

Combine email, voicemail, and fax so you don't lose sight of your important messages.

With 18 million users worldwide, Eudora has always been a leader in communications technology. So the innovation of Eudora Pro CommCenter 4.0 should come as no surprise. It stands alone in offering a software package that brings all your communications together right on your computer. All in an easy-to-install, user-friendly interface that maximizes flexibility.

Of course, Eudora Pro CommCenter incorporates Eudora Pro Email 4.0. It offers the most advanced mail tools on the market, such as HTML viewing and composing. Enhanced window management. Security and virus protection. IMAP and LDAP support. And powerful filters like auto-sorting and reply. You'll also have the ability to manage mailing lists and multiple email accounts. All for an estimated street price of $59, with a $20 mail-in rebate for Eudora Pro Email users. You'll find details inside the box.

So log on to our Web site for more information on Eudora Pro CommCenter and a free 30-day trial of Eudora Pro Email 4.0.

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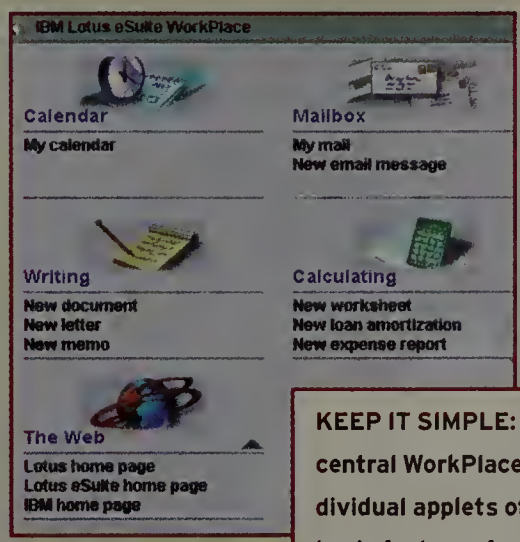
ESuite: Power Users Need Not Apply

LOTUS'S ESUITE, a collection of scaled-down applications designed to run off a network server, won't be of the slightest interest to experienced PC users. But for general office staffers whose workday does not revolve around their computers, ESuite offers a solid set of basic apps in a simple interface—albeit with a few holes. The product is currently available for Network Computers, and a version for networked PCs is expected to ship by summer. I tested a preproduction release for PCs, and I also saw a version running on an IBM NC, where ESuite's performance looked snappy—on a par with typical office suite apps running on a PC.

EASY ON THE USER

WITH ESUITE applications, "easy to use" is an understatement. You don't need a manual, though extensive online help is available. The individual applets can handle mundane chores: The word processor, for example, has a relatively full feature set, including text attributes, tables, and hyperlinks. But the sacrifices are significant. You can't import files from popular word processors, and most glaring of all, there's no spelling checker. (A Lotus spokesperson says the next version, due for release this summer, will have one.)



KEEP IT SIMPLE: ESuite's central WorkPlace and individual applets offer basic features for less demanding users.

ESuite's Calculator spreadsheet applet offers extensive formatting features but contains only 20 functions. While most users will find what's included adequate, the applet notably lacks the @if function, which makes a spreadsheet "smart" by performing simple calculation decisions. Also missing are two functions frequently used in financial applications: @hlookup and @vlookup.

Esuite also includes a basic presentation applet with a good variety of templates, plus a surprisingly complete Web browser with features comparable to Microsoft Internet Explorer 3.02's, internal and external e-mail support, a calendar, and an address book.

USEFUL TOOL

ESUITE APPLETS do an excellent job of matching the needs of their potential users. I didn't find ESuite's shortcomings—other than the lack of a spelling checker—significant. I used it to quickly produce a letter, a simple budget worksheet, and a small presentation. However, the product is designed to be attractive to managers concerned with reducing the cost of buying and maintaining their company's PCs. At about $50 per user and with such minimal hardware requirements, ESuite is a tempting alternative to full-blown office suites, especially for businesses with hundreds or thousands of computer users who need only basic features.

—Stan Miastkowski

What's Missing in ESuite?

Applet	Not included
Word processor	Spelling checker, file imports from major word processors.
Spreadsheet	Some key functions, including @if, @hlookup, and @vlookup.
Presentation graphics	Advanced transitions; support for animation, video, and sound.
Web browser	Newsreader, chat, dynamic HTML, subscriptions, and channels.

Navigator, can view JDOC files on a Web site; but Acrobat files require a special viewer.

MICROSOFT FRIENDLY

BOTH WORD PRO and 1-2-3 in the Millennium Edition are similar to their predecessors, with some notable exceptions. The new version's Sticky File formats let both Word Pro and 1-2-3 users work more easily with Word and Excel files from Office 95 and 97. Previously, if you wanted to use 1-2-3 to work with an Excel file, you had to import the file, do your work on it, then export it—and something often got lost in all the translations. Now you can bypass those extra steps; all you do is open, work on, and save the Excel file, and it remains in its original file format.

In tests with Word Pro, I opened, modified, and saved complex Word 95 documents in the new Word Pro without a hitch. However, when I tried to save a Word file with extensive revision markings, my PC crashed. (A Lotus spokesperson said that the company will correct the problem in the shipping version.) I was successful working with Excel 95 files from 1-2-3.

Word Pro's other new enhancements are minimal. One feature for former Word and WordPerfect users lets you type in commands from your current word processor and have the equivalent Word Pro commands pop up. Another easy-to-use feature lets you create handy forms, such as expense reports, that you can distribute by e-mail, with blank fields people fill in.

According to Lotus, future changes to 1-2-3 will include a Web Tables feature that allows you to import text and numeric data from a Web page and drop them into a spreadsheet, where 1-2-3 will convert the data into spreadsheet tables. (Our beta didn't include this feature.) To make it easier for Excel users to move to 1-2-3, Lotus added a pop-up screen that shows the equivalent 1-2-3 command when you type an Excel command.

For number crunchers, there are 50 new functions. The new spreadsheet can also generate larger worksheets—up to 65,536 rows. ▶

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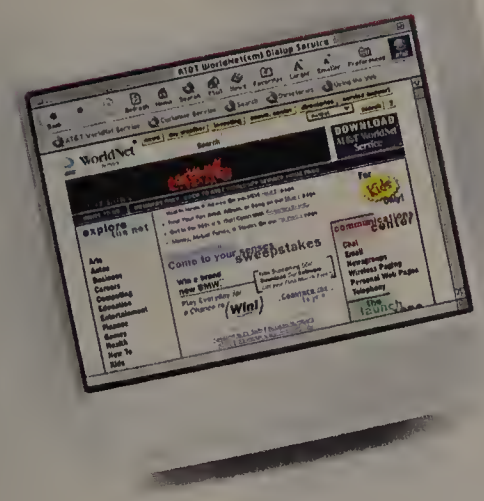

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Voice Recognition Goes Beyond the Suite Spot

LOTUS ISN'T the only vendor adding speech technology to its products. Corel plans to release a version of WordPerfect Suite 8 in early May that lets you dictate text into an open document and cut and paste or format blocks of text by simply barking out commands. This version will cost $425 ($129 for the upgrade). In its next full version, WordPerfect Suite 9, Corel plans to add voice capabilities across the suite's other applications, such as the Quattro Pro spreadsheet. Even Microsoft, which appears to be lagging in this area, is on the move: At press time,

the company's Web site posted news that a voice-enabled version of Word is "coming soon."

OTHER APPS

UNIFIED MESSAGING products—which let you store e-mail, voice mail, and faxes in one in-box and retrieve them by phone or PC—are about to take a step forward. General Magic (www.genmagic.com) claims that its Serengeti product, expected to ship later this year, will act as a personal assistant. When you call the service, it will tell you that you've got, say, ten new e-mail messages, two voice mails, and four faxes. The system, which is expected to cost $15 to $60 per month, can then use speech technology to read your e-mails, play back voice mail, and even read fax messages back to you. When you respond to e-mail messages, your reply will take the form of a "vocument"—an audio file attachment. General Magic says Serengeti will also work with your Web browser, and can read you, for instance, the latest news updates from your favorite sites.

Clarion's $1299 AutoPC (www.autopc.com), due to ship in early fall, is a souped-up car radio that includes a PC based on Microsoft's Windows CE, a voice interface, and support for wireless communications. Its computerized voice can provide street directions and real-time news, the vendor says. The device will let you both listen and respond to e-mail. The $1299 AutoPC will ship in early fall.

—Aoife McEvoy

In addition, the Millennium Edition of 1-2-3 will include some voice-input functions (also not in the beta) that let you enter commands and data with your voice on a few premade templates for loans, invoices, and expense reports. For this feature to be really useful, you should be able to dictate data into any spreadsheet; you can't.

Other applications included in SmartSuite's Millennium Edition have minor upgrades. Among them, Freelance Graphics has an enhanced Save and Go option; it creates a portable presentation that you can put on a floppy disk or send by e-mail, allowing any user to run the presentation without needing Freelance on their PC. Lotus Organizer will be able to exchange data with personal digital assistants such as 3Com's PalmPilot.

New SmartSuite Offers Small but Useful Improvements

FEATURES	Where to find it	What it does	Benefits
Internet integration	throughout suite	All applications now support HTML import and export.	Only suite with so much HTML support across all applications.
Easy Web-site creation	FastSite application	Creates Web sites for the Internet and intranets.	Easy to use, excellent for adding existing files to a Web site.
JDOC format [1]	throughout suite	Converts complex documents into a format any Web browser can view.	Competing products like Adobe Acrobat require a proprietary viewer.
Sticky File format	Word Pro, 1-2-3	Lets users directly open, edit, and save Word and Excel files without converting them.	Works well on basic files (though beta had problems with some complex documents).
Menu Finder [1]	Word Pro	Provides WordPerfect and Word command help.	Designed to ease transition from competing products to Word Pro.
New @functions	1-2-3	Has 50 new @functions, including engineering, math, statistical, range, database, and financial functions.	Spreadsheet jockeys can never have too many @functions.
Web tables [1]	1-2-3	Converts Web data into native 1-2-3 format.	Easy way to copy the latest Web data, such as stock quotes, into a spreadsheet.
Excel command help	1-2-3	Displays equivalent 1-2-3 command (and help) when users type an Excel command.	Designed to ease transition from Microsoft Excel.

[1] Not available in beta version that *PC World* tested.

UPGRADE OR NOT?

SHOULD YOU upgrade to the Millennium Edition? If you do a lot of Web work, the Internet features will be of interest. The new suite's Web features and cross-application HTML integration are miles ahead of the competition, making the product something to consider even if you currently use Microsoft Office or WordPerfect Suite. Also, if you're a Lotus holdout collaborating with a lot of Office users, the exchange feature for Sticky File formats may save you time and aggravation. However, current SmartSuite users who don't need these features may want to stay where they are, since the core applications have not changed that much.

—*Stan Miastkowski* ▶

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Pentium II Portables: Speedy but Power Hungry

INTEL'S Pentium II is finally ready for the road—and heading straight to the top of our performance charts. The first notebooks powered by the mobile edition of the desktop workhorse are the fastest we've tested to date, and we're not just talking minor speed bumps. PC WorldBench 98 scores for the five Pentium II-266 notebooks we looked at—Dell's Inspiron 3200 D266XT, Gateway's Solo 9100LS, IBM's ThinkPad 380XD and ThinkPad 600, and Quantex's H-1331—averaged nearly 18 percent higher than those of the previous champs: similarly configured notebooks with Pentium MMX-266 CPUs.

Power users who depend on notebooks for demanding tasks—graphics designers and developers, for example—will welcome the solid performance boost. In our PC WorldBench 98 tests, the ThinkPad 380XD and the Solo 9100LS shared top honors with a whopping score of 146. The spread between all five systems was minuscule, however, with the lowest-scoring Quantex H-1331 checking in at an almost equally impressive 142. The fastest PMMX-266 we've tested with a similar configuration—Micron's Transport XKE—scored just 126.

BATTERY BATTLE

BUT YOU'LL pay for these new power portables—and not just in cold cash. The mobile Pentium II consumes considerably more power than its PMMX counterpart. Average battery life for the five PII notebooks was just under 3.75 hours, compared to 5.3 hours for the PMMX-266 notebooks we've tested. That's a 30 percent battery life hit. While battery life for three of the PII notebooks qualified for a rating of satisfactory in our charts, the other two are considered poor—a notable downside for frequent travelers.

YOUR NEXT DESKTOP?
PII portables from Dell (left) and IBM are among the fastest.

The performance of these Pentium II notebooks still lags behind that of current desktop systems, which are now shipping with PII-300 and PII-333 processors and racking up WorldBench 98 scores in the 160s and 170s. And with the first Pentium II-400 processors expected by summer, the performance gap between desktop replacement and desktop system shows no sign of narrowing. Most power desktop systems also offer 6GB to 8GB hard drives, compared with the 4GB to 5GB drives on these PII notebooks.

The cheapest PII-266 notebook—the Inspiron 3200 with 64MB of RAM and a 4GB hard drive—costs a hefty $3199. However, Pentium II notebooks cost only $200 to $400 more than their Pentium MMX counterparts.

THE LINEUP

IF YOU WANT a notebook loaded with multimedia features, consider Gateway's $4300 Solo 9100LS. It's the only notebook with a DVD-ROM drive, a 14.1-inch screen, and composite video-in and video-out plugs. It scored well on the battery test, and you can put a second battery in its modular bay. But the Solo 9100 is also the heaviest of these notebooks, with a traveling weight of 9.4 pounds. ▶

PENTIUM II IS NEW NOTEBOOK CHAMP

SYSTEMS	CPU	PC WorldBench 98 score
Gateway Solo 9100LS	Pentium II-266	146
IBM ThinkPad 380XD	Pentium II-266	146
Dell Inspiron 3200 D266XT	Pentium II-266	145
IBM ThinkPad 600	Pentium II-266	144
Quantex H-1331	Pentium II-266	142
Average of 2 notebooks	Pentium MMX-266	123

Word 97 · Excel 97 · Picture Publisher 7.0 · Paradox 8.0 · Word Pro 97 · 1-2-3 97

All systems had 64MB of RAM and a 512KB secondary cache.

HOW WE TEST We tested all systems with PC WorldBench 98, PC World's application-based benchmark. A higher PC WorldBench 98 score is better. For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/benchmark). Data based on testing conducted by the PC World Test Center. All rights reserved.

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A New Dimension in Thin

OKAY, AGENT 007, your new notebook is in. It's less than three-quarters of an inch thick, so it fits in your attaché case's false bottom. It weighs only 3.2 pounds, so it won't drag you down when you're skydiving. But open it up, Mr. Bond, and you've got a 12.1-inch active-matrix screen and a full-size keyboard that's surprisingly comfortable for touch typing.

Hewlett-Packard's new OmniBook Sojourn is for upscale users who want the thinnest and lightest notebook possible without sacrificing other prized notebook attributes—a large LCD display, 64MB of RAM, and a good keyboard. You will have to settle for a less-than-state-of-the-art Pentium MMX-266 processor and a slightly skimpy 2.1GB nonremovable hard drive. You'll also have to work quickly: According to HP, even when unfettered with a CD-ROM or floppy drive, the Sojourn will run for only 1 to 1.5 hours.

The notebook comes with a slicelike device that connects to the bottom of the base unit and adds a CD-ROM drive, a floppy drive, and a bunch of ports. An optional $800 slice includes a battery. Of course, using these slices brings the notebook back to a conventional thickness—and a carrying weight of about 6 pounds .

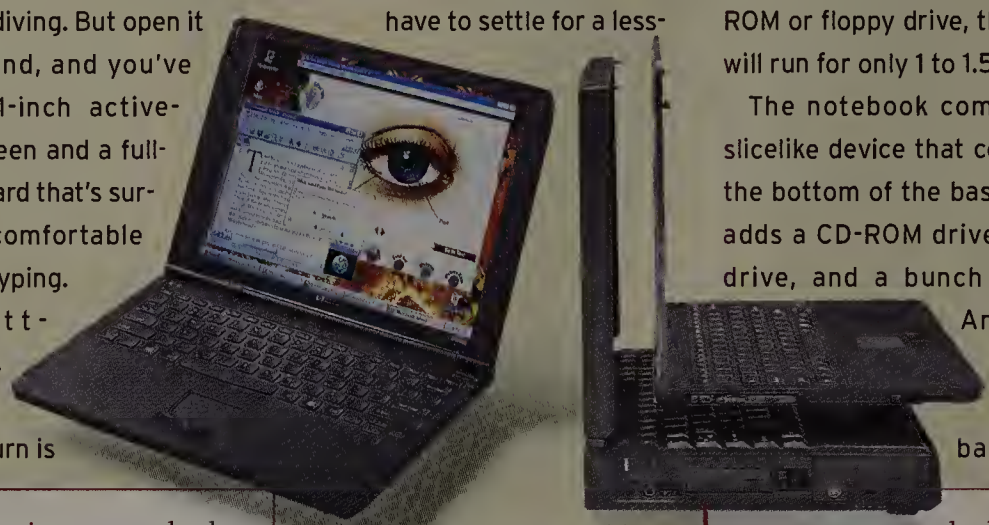
TWICE THE PRICE

BY THE WAY, Mr. Bond, this notebook, slated to ship in mid-April, costs $5799—almost twice the price of a comparable model that's twice as thick and heavy. So while the Sojourn feels reasonably sturdy, be careful. I'd hate to see Q's face if you demolish it.

—Yardena Arar

• **HP OmniBook Sojourn** $5799; Hewlett-Packard; 800/322-4772; www.hp.com

READER SERVICE NO. 761



THINK SKINNY, BUT NOT MINI: At just .71 inches thick and 3.2 pounds, HP's new OmniBook Sojourn (left and top right) makes other notebooks look pretty bulky (right, bottom).

Dell's Inspiron 3200 also lets you add another battery, and you'll need it. Battery life in our tests lasted under 3 hours, only a scant 4 minutes longer than the bottom-ranked Quantex. Still, its $3199 price makes the Inspiron 3200 a PII bargain.

The $3299 Quantex H-1331 is configured much like the Dell, with a 13.1-inch screen and 4GB hard drive. It is the only unit that ships with Microsoft Office.

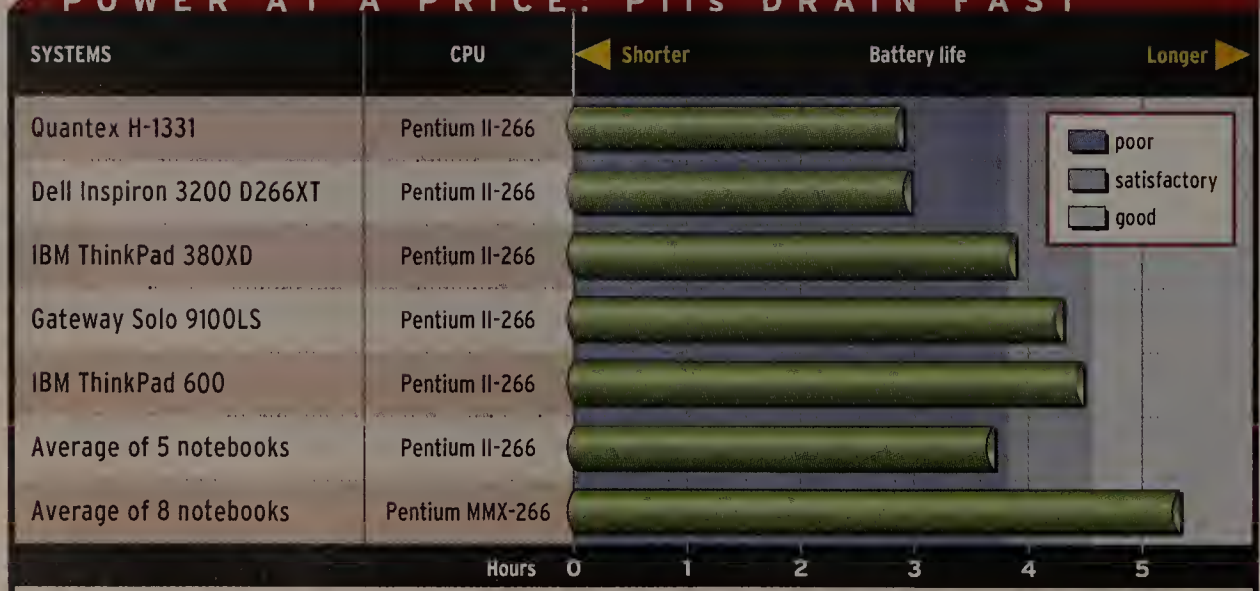
IBM, as usual, charges a premium. Both ThinkPads let you swap in a new battery without shutting off the machine. The 380XD should sell on the street for about $4024. Our model included a 5.1GB hard drive (the others all had 4GB). Its principal drawbacks are a 12.1-inch LCD screen—the smallest display in the group—and a heavy 8-pound traveling weight.

The ThinkPad 600 is the thinnest and lightest of this group, with a traveling weight of 6.4 pounds. It's the only notebook here with a built-in modem. The 600 also posted the longest battery life—just shy of 4.5 hours. The major drawback is its steep $4934 price.

If you need the fastest notebook on the market, any of these PII notebooks are worthy candidates. But before you buy one, make sure you're comfortable with the trade-off in battery life. If you need both performance and long-running batteries, consider waiting for future PII models: Historically, vendors have been able to juice up battery life for power-hogging processors—it just takes a little time to get the technology together.

—*Yardena Arar*

POWER AT A PRICE: PIIs DRAIN FAST



HOW WE TEST We drain and fully recharge the battery twice and set power-saving options to match a consistent profile where possible. Office workers use Windows 95 applications, periodically saving and allowing regular idle time. Notebooks are rotated among workers. We report the time elapsed when the notebook shuts itself off. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

Note: All prices are street for the machines tested.

• **Dell Inspiron 3200 D266XT** $3199; Dell; 800/388-8542; www.dell.com

READER SERVICE NO. 762

• **Gateway Solo 9100LS** $4300; Gateway 2000; 800/846-2000; www.gw2k.com

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• **IBM ThinkPad 380XD** $4024, **IBM ThinkPad 600** $4934; IBM; 800/426-2968; www.ibm.com

• **Quantex H-1331** $3299; Quantex; 800/896-4898; www.quantex.com

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PHOTOGRAPHS: KEVIN CANDLAND

HOW TO SAVE FILES THAT START

WITH THE LETTERS WWW.

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BECAUSE IT'S YOUR STUFF.

Finally, an Easy Web Speedup That Works—Sometimes

NOW FOR some good news about Internet performance. Intel's Quick Web, a new service that some Internet service providers are rolling out, provides a cheap, easy way to speed up your Web browsing dramatically. The service uses your existing phone line and modem, and at only $5 extra per month, Quick Web service is not a huge investment. But caveats and hype abound.

QUICK AND QUIRKY

QUICK WEB software resides on your ISP's servers and shortens download times using a combination of compression and caching. When you browse a Web page, Quick Web finds all the .gif and .jpg images embedded in it and compresses them on the fly so it sends less data to your PC.

Additionally, the ISP's server caches each page you hit, so other users who subsequently surf the same site can pull it directly from that server instead of having to wait for it to travel over the Internet. Currently Erols, Global Center, and Netcom offer Quick Web, and Intel is negotiating with other ISPs that want to offer the service, says Dave Preston, Intel's marketing manager for Quick Web. (Intel maintains a list of Quick Web ISPs on its Web site at www.intel.com/ quickweb/).

Erols's ads for Quick Web boast of "downloads up to 500 percent faster!" In our hands-on tests, download performance improvements were all over the map, ranging from a mediocre 10 percent to a whopping 341 percent.

Over 28.8-kbps modems, graphics-heavy pages, like the Boeing site we tested, downloaded up to 341 percent faster with the help of Quick Web. For example, the Boeing home page took 75 seconds to download without Quick Web and only 17 seconds with it. More-typical Web pages that mix text and graphics together, like the *Business Week* or CNN sites, show 29 and 10 percent improvement, respectively.

We also performed limited testing with a 56-kbps modem and found similarly impressive but inconsistent results, ranging from 20 to 270 percent faster downloads with Quick Web at work.

ISPs Offering Quick Web

- **EROLS,** 888/463-7657, www.erols.com/
- **GLOBAL CENTER,** 800/463-8386, www.globalcenter.com
- **NETCOM,** 888/316-1122, www.netcom.com

CAVEAT SURFER

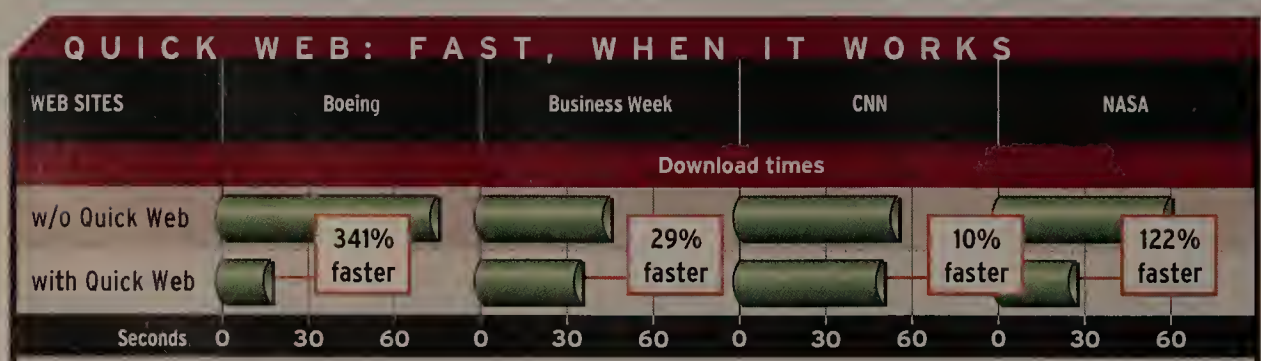
INCONSISTENT performance wasn't the only problem, however. No matter what modem you use, you may find Quick Web's image compression annoying. To reduce the amount of data sent to your PC, Quick Web uses a compression algorithm that can dramatically reduce image quality. Most of the time the image degradation didn't really matter; other times it did. For example, we couldn't read portions of the *Business Week* site where text was embedded in an image.

You can turn off this compression by pressing the Normal button on Quick Web's Speed Selector window, but then you lose most of your potential performance gain. Additionally, Quick Web can't compress pages that have already been optimized for speed with small, low-resolution graphics.

WORTH A TRY

QUICK WEB'S low price and simple installation make it a good choice for anyone who wants to bypass the hassle and expense of high-performance Web access options such as cable modems, ISDN, and satellite Internet connections. If Quick Web performance proves to be too inconsistent for your tastes, you can always cancel it and try one of the other options. And unlike other low-cost options, such as browser accelerators and modem doublers (see *Top of the News,* March 1997 and April 1998, respectively), Quick Web can dramatically reduce Web page loading times.

—*Dean Andrews* ■



HOW WE TEST All tests run under Navigator v3.02 and Internet Explorer v3.02 with memory and disk caches clear. Using 28.8-kbps modems, we dialed from Boston and San Francisco into Quick Web servers at Global Center, Intel, and Netcom. We downloaded home pages between 11 a.m. and 1 p.m. as well as 4 p.m. and 6 p.m. Average times shown. Data based on tests conducted by *PC World.* All rights reserved.

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G6-333XL pictured with G-Series tower case.

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PC World Best Buy, January 1998

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- Canon® BJC®-4300 Color Bubble Jet Printer **$199**
- Epson Stylus COLOR 800 Ink Jet Printer **$349**
- Hewlett-Packard LaserJet 6Lse Laser Printer **$399**
- Hewlett-Packard 890Cse Color Ink Jet Printer **$399**
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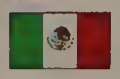
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Hewlett-Packard vs. Canon: New All-in-One Laser Printers

LOOK SHARP: HP LaserJet 3100 and Canon MultiPass L6000 offer laser quality, multifunction convenience.

PHOTOGRAPH: MARC SIMON

ALL-IN-ONES

THE PRODUCTS we see at *PC World* fall into two classes: Show horses that do new tricks, and workhorses that do everyday jobs, but better. Multifunction printers will never be mistaken for show horses, but they might save the day the next time you need to print and fax a long report from your home office. Hewlett-Packard and Canon have released their first laser-printer–based units, the HP **LaserJet 3100** and the Canon **MultiPass L6000**. Street-priced at $699 and $599, respectively, they're not much cheaper than what you'd pay for a stand-alone laser printer and plain-paper fax machine. But they're compact and far more versatile. Besides doing everything a fax machine and a printer can, these devices let you fax from within Windows applications, store and manage incoming faxes on your PC, and scan text and graphics.

While lacking the color capability of ink jet multifunction printers, these new Canon and HP all-in-ones confer all the business-quality benefits of laser printing—faster performance, sharper text, lower per-page costs, and simpler maintenance. Head to head, the HP LaserJet's slicker software and extra fax features make it the better buy, based on my experience with shipping units of each model.

THAT'S MULTITASKING

THESE VERY SIMILAR devices, which are roughly the size of a typical personal laser printer, double as full-fledged fax machines that enable you to send and receive documents, whether the PC is turned on or not. They also allow you to make copies and do gray-scale scanning, though they handle only loose sheets, not bound volumes. And both machines can do more than one job at a time: They can print while receiving a fax, for instance.

Judged as laser printers, the LaserJet and MultiPass are close competitors. Both produce crisp 600-dpi text and smooth gray-scale graphics. The rated engine speed for each of these units is 6 pages per minute. In my informal tests, the printers came close to that speed with text documents, but photos and other graphics took much longer.

But once you move beyond basic faxing and printing, the LaserJet's especially thoughtful design becomes apparent. When you insert a document into its feeder, for example, its software automatically pops up, letting you efficiently fax the document, make a copy, or scan it for use in other programs. And using the bundled ReadIris optical character recognition software makes turning a scanned document into editable text for your word processor a quick, straightforward drag-and-drop job.

The Canon MultiPass's software has a similar look, but it doesn't let you drag scanned documents into other applications. It's particularly tough to figure out how to convert a scanned document into a form you can use in a word processor—a problem that isn't improved by the fact that neither the printed manual nor the document manager's on-screen help ever mentions the bundled TextBridge Classic OCR software. Still, the MultiPass's software story isn't

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INTERNET

online

FOR MORE PRODUCT news and the latest announcements, check out the PC World Daily News Service at www.pcworld.com/news.

LaserJet 3100

PRO: Good print quality; well-designed, well-integrated fax, copy, and scan features.
CON: Not a lot of bundled software.
VALUE: High-grade product at a reasonable price.
Street price: $699
Hewlett-Packard
800/752-0900
www.hp.com
READER SERVICE NO. 739

MultiPass L6000

PRO: Good print quality, nice Web software bundle.
CON: Software integration and fax features not great.
VALUE: Not bad, but the HP's a better buy.
Street price: $599
Canon
800/652-2666
www.ccsi.canon.com
READER SERVICE NO. 740

all bad: It includes such useful add-ins as Canon WebRecord (an excellent utility for capturing and printing Web pages) and Starfish Software's Internet Utilities 97.

For serious faxaholics, the HP LaserJet 3100 wins hands down. Unlike the MultiPass, it lets you auto-forward faxes to another machine, retrieve faxes remotely, or require that a password be entered before received faxes are printed. (With these features, you must store faxes in the LaserJet's memory rather than the PC's.)

Used as a photocopier, the LaserJet can reduce or enlarge pages to any size from 50 to 200 percent; in contrast, the MultiPass can't enlarge and reduces only at 90, 80, or 70 percent. So all in all, the HP makes a better all-in-one.

—*Harry McCracken*

Presario 2240: Compaq's $799 PC Stacks Up

DESKTOP

A FLOOD OF $800 entry-level PCs has struck the market. Among big-name choices, the Compaq **Presario 2240** edges out similarly configured, comparably priced systems such as IBM's $699 Aptiva E16. I reviewed a shipping unit.

Like its peers, the 2240 excludes a monitor at its $799 bargain price. For $200 extra, you can get a 14-inch Presario V410e color monitor with a 13.2-inch viewable area.

The Presario 2240 runs on an AMD K6-200 CPU supported by a 256KB secondary cache and carries 32MB of synchronous DRAM (expandable to 48MB). In contrast, the IBM Aptiva has a slower AMD K6-166 chip and just 16MB of RAM. The Presario 2240 also packs a 10X–20X CD-ROM drive, a 56-kbps modem, and a 64-bit PCI graphics chip set on the motherboard. In addition to all the hardware, Compaq bundles Microsoft's Windows 95, Encarta, Works, Bookshelf, Money, and IE 4.0; and Intuit's Quicken.

KEEP IT SIMPLE: The Presario 2240 is fine for Web surfing or word processing, less suitable for 3D or graphics work.

You do make some sacrifices. The Seagate hard drive is a skimpy 2.1GB. The slim-line desktop case has just three card slots, one of them occupied by the modem, leaving one ISA slot and one shared PCI/ISA slot. Only one of the four drive bays is free. And you get just 1MB of graphics memory, although Compaq will add 1MB more for $14. Finally, upgrading this PC is likely to be difficult down the road.

Still, this Presario is a viable home system for Web surfing, playing CD-ROM titles, and doing simple word processing and home finance tasks. For more demanding jobs like image editing, advanced 3D games, or videoconferencing, you really need more PC.

Compaq backs the 2240 with a one-year parts and labor warranty and unlimited free phone-in tech support during the warranty period. But shop carefully for your budget PC: Competition among processor and system makers means you'll get more PC for $800 as the year progresses (see *Top of the News*, "Intel's Celeron-266: Cheap! But Will This Fledgling Fly in Sub-$1000 PCs?").

—*Dean Andrews* ▶

Presario 2240

PRO: Handles simple home PC chores for a low price.
CON: Limited upgrades, not for demanding apps like image editing.
VALUE: Good for now, but shop carefully—competition's increasing.
Street price: $799 without monitor
Compaq Computer Corp.
800/345-1518
www.compaq.com
READER SERVICE NO. 741

EDITED BY
Yardena Arar and Laurianne McLaughlin

Hail the New Roamin' Emperor: Palm III

P D A

WHEN I REVIEWED the first PalmPilot PDA, I dubbed it the Road Warrior's Roamin' Emperor. I wasn't the only one who pocketed the Pilot: 3Com has sold more than a million of these 6-ounce electronic organizers (good news for Pilot fans, since 3Com's leading market share means software developers continue to release applets). This month, 3Com will ship the **Palm III** with 2MB of RAM. After reviewing a preproduction unit, I say, "All hail the new emperor!"

Attracted by the PalmPilot's success in this formerly moribund market, numerous companies have done knockoffs. Among the pretenders: a bevy of new Windows CE 2.0 devices that Microsoft not-so-subtly calls Palm PCs. The Palm PCs are not terrible, but they are more complicated to set up and use than the PalmPilots. And judging by the improvements in the $399 Palm III, I think this is the one you'll want to take into daily battle.

DESIGN TWEAKS

ALTHOUGH somewhat sleeker than the PalmPilot, Palm III keeps its predecessor's basic design. Like previous versions (the 1MB PalmPilot Professional Edition and the 512KB Personal Edition), the Palm III offers simple one-button synchronization—of your schedule, contact information, to-do items, and memos—with your desktop PC. You can perform the synchronization via a cradle that connects to the desktop PC's serial port, or via an optional Palm modem.

PALM III's THE CHARM: The new version of 3Com's hit PDA sports an infrared port.

A sturdier (now metal) stylus lets you input data using the device's Graffiti handwriting recognition software. (This crib system for printing letters takes time to learn, although most Pilot fans say it works adequately.) Instead of having a leather protective slipcase, the Palm III uses a hinged, removable plastic door to cover its screen. I prefer the look and feel of the old case.

Also new to the Palm III, infrared beaming capability lets you share data and applications with other Palm III users at the touch of a button. Placing two units about 1 foot apart, I managed to send a contact entry, an appointment, and an entire application in seconds. Heretofore, transferring data between two PalmPilots required a multistep process via the PC.

BETTER FONTS AND IMPORTING

PREVIOUS USERS of the PalmPilot complained that its fonts were sometimes hard for them to read, even with backlighting. The Palm III's three font options, including bolder and larger text, are therefore most welcome. And the font options are easy to change on the fly.

With the added File Linking feature, I had no trouble automatically importing data from a file on a remote server each time I performed my desktop sync. Previously an extra-cost option, the network HotSync capability connects me to my data remotely via a network or dial-in access, and now via a TCP/IP connection. 3Com says the shipping Palm III will run for six to eight weeks on two AAA batteries.

The bundled Bonus Pack CD-ROM contains third-party applications and synchronization conduits for such desktop PIMs as Symantec ACT and Microsoft Outlook 97.

If you can't afford a Palm III, prices for the PalmPilot Professional and Personal editions have been reduced to $299 and $199 respectively. Already own a PalmPilot? In June, 3Com says it will begin selling a $129 2MB memory upgrade card for previous versions that will provide the latest OS and an infrared port similar to the one on the Palm III. This Emperor won't be overthrown soon.

—*Michael S. Lasky* ▶

Palm III

PRO: Improved version of the admirable PalmPilot PDA.

CON: Could have bundled a bit more software with it.

VALUE: Great choice, worth the upgrade for Pilot fans.

Street price: $399

3Com Corp.

800/881-7256

www.palm.com

READER SERVICE NO. 742

QUICK TAKES

PalmPilot Goodies

MORE THAN 1000 commercial and shareware programs for Palm III and PalmPilot reside online. Get help finding them from Sierra On-Line's $29.95 **Software Companion for PalmPilot.** This CD-ROM holds 26 licensed shareware apps, tools, and games. The Graffiti alphabet helper, for instance, replaces the easily lost paper crib sheets that come with the PalmPilot. Abroad calculates foreign currencies and measurements on the fly. Big Tipper computes 5 to 25 percent service gratuities, and PostCalc calculates postage based on weight and destination. Software Companion also packs on a couple of advanced calculators and ten games. Sierra On-Line, 800/757-7707, www.sierra.com.

READER SERVICE NO. 743

—*Michael S. Lasky*

Helpful Copilot

FORGET THE MANUAL: Steve M. Schafer's $29.99 **PalmPilot Companion** offers previously undocumented tips for using the Palm devices effectively. The book is particularly lucid in explaining how to get up and running with the e-mail client. It comes with five dozen shareware apps, utilities, and games (with documentation for each), plus suggested sources for other Palm software downloads. Que Publishing, 800/571-5840, www.mpc.com.

READER SERVICE NO. 744

—*Michael S. Lasky*

It may not be your father's monitor, but it could be your grandson's.

Our engineers take pride in their work. That is why they have designed our monitors with an increased bandwidth. This extra bandwidth means that even while running at their maximum resolution, our monitors are not being pushed to their limit. The result is components that run cooler and therefore last longer.

VisionMaster 450 $799*

How much longer? Our VisionMaster 450, for example, has a Mean Time Before Failure (MTBF) of 46,900 hours. This equates to 23.4 years of life when used in normal business applications.** So that monitor you just bought could very well be used to put your teenage son through college and his son through high school.

This philosophy of building high-quality, long-lasting products goes into everything we do. Take USB for example. Other manufacturers make their customers buy a new monitor if they want the latest technology (like USB) integrated into their monitors. (Perhaps this is because after three years they need a new monitor?) iiyama has designed a convenient and cost-effective upgrade solution – a USB hub that replaces the user's existing tilt/swivel stand.

It is due to innovations like these and a unique devotion to quality that makes iiyama monitors so reliable.

Model/ Viewable Area	Dot Pitch/ CRT Type	Max. Horizontal Scan Rate	Max. Resolution	Est. Street Price
VisionMaster Pro 500 (19.5" VIS) VisionMaster 500 (19.5" VIS)	0.28mm/AG 0.27mm/dp	110kHz	1800 x 1440 @ 74Hz	$1379 $1329
VisionMaster 450 (18.0" VIS)	0.26mm/ High Contrast	102kHz	1600 x 1200 @ 80Hz	$799
VisionMaster Pro 17 (16.1" VIS) VisionMaster 17 (16.1" VIS)	0.25mm/AG 0.26mm/dp	92kHz 86kHz	1600 x 1200@74Hz 1600 x 1200@69Hz	$649 $589

*Monitor shown with optional USB hub. ($130 ESP)

iiyama

(800) 594-7480 www.iiyama.com

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**8 hours a day/5 days a week/50 weeks a year. MTBF excludes CRT life, which may vary from model to model. Prices and specifications are valid as of 02/05/98. Estimated Street Price is shown, actual price may vary. Prices do not include shipping, handling and any applicable taxes. Specifications are subject to change without notice. As an Energy Star™ Partner, iiyama has determined that this product meets the Energy Star™ Guidelines for energy efficiency. For more information, please write us at 575 Anton Blvd., Suite 590, Costa Mesa, CA 92626. 800/594-7480, 714/437-5111, Fax:714/437-5982; Home Page: www.iiyama.com

PC Magazine Best of 1997 — January 6, 1998 VisionMaster Pro 17

Cadalyst Labs — Perfect Five-Star Rating, January 1998, VisionMaster 450, VisionMaster Pro 500

ComputerLife — Perfect Five-Star Rating, November 1997, VisionMaster Pro 17

Performance & Technical Excellence, March 1997, VisionMaster Pro 21

MW Editors' Choice — Six Time Winner, Jan 1997, Feb 1997, March 1997, April 1997, May 1997, June 1997, VisionMaster Pro 21

PC Magazine Editors' Choice — October 7, 1997, VisionMaster Pro 17

Cadalyst Labs 4½ Star Rating — March 1997, VisionMaster Pro 21

PC World Best Buy — Six Time Winner, July 1996, Jan 1997, March 1997, July 1997, Sept 1997, Jan 1998, VisionMaster Pro 17

Circle 108 on reader service card

CrossPad Sends Notes From Paper to Your PC

GADGET

I HAVE FOLDERS full of paper pads, and though I'd like to transfer the scribbled notes to my PC, I never have the time. Sound familiar? I've found the solution: Cross Pen Computing's unique **CrossPad.** This slim 2.2-pound plastic tablet holds a paper notepad on top of an electronic pad. Using a special pen, I write with ink on the paper; at the same time, the electronic pad underneath saves my notes in the device's 1MB of flash ROM. Later on, I can upload the notes to my PC using an included cable.

WRITE STUFF: The CrossPad saves notes in memory as you write on paper.

This puts all my notes in my PC, searchable by date and keyword. (You designate keywords by circling them, then clicking a button.)

Your notes are not saved in editable (ASCII) text: When you call up notes on your PC, you see an image of your printing or handwriting. You can also save sketches, such as maps or diagrams.

Cross describes the CrossPad as "a portable digital notepad." Street-priced at $399, it's easy to tote. You'll quickly master the few buttons: When you flip a paper page, for example, you click the Page Forward button for a new electronic page.

Cross bundles IBM Ink Manager software for managing the files on your Windows 95 computer. The program can also convert handwritten notes to editable text, but for this feature to work well you must write very neatly. An early version of the software converted about 70 percent of my words correctly after I had done the two 20-minute handwriting training exercises. The program's less-than-astounding handwriting recognition talents don't offer an independent reason to buy the CrossPad, but neither are they cause to reject it. For many people, organizing handwritten notes is a major benefit.

The CrossPad can store 50 pages before you need to upload or delete any text. It runs for three to four months on four included AAA batteries.

—Laurianne McLaughlin

CrossPad

PRO: Saves handwritten notes and sketches and sends them to a PC.
CON: Can't perfectly convert to text.
VALUE: Highly useful business tool.
Street price: $399
Cross Pen Computing Group
800/510-9660
www.cross-pcg.com
READER SERVICE NO. 745

QUICK TAKES

Monitor Gadget

DO YOU crave a brighter screen or more privacy? If so, picture this: N' Da' Shade, a monitor hood, slips over your monitor like a cardboard box, open at the top and bottom. Unlike plastic glare screens, this $25 shade is made of polyurethane laminate; the surrounding cardboard comes in a variety of styles, ranging from a faux wood texture with butterfly motifs to faux leather. The product fits 14- to 17-inch monitors without integrated side speakers. Black lining inside the hood improves monitor color saturation while reducing glare. The hood itself extends like a virtual tunnel about a foot beyond your screen, so no one can peek at it. N' Da' Shade, 707/874-1216, www.sonic.net/dashade.

READER SERVICE NO. 747

—Michael S. Lasky

Paint Shop Pro 5: The Price Is Right

GRAPHICS

NEED TO CREATE a snazzy logo or retouch an old photo? **Paint Shop Pro 5,** an inexpensive paint program by Jasc Software, is in a class by itself. For $59, it provides the key features you need and remains easy to use, intuitive, and even fun. My experience with a beta version suggests that fans of previous releases will like Paint Shop Pro 5.

The program supports layers, for blending and grouping images; unlimited undo levels, so you can recover from a bad mistake; and CMYK for professional color separation.

There's even a Picture Tube, reminiscent of the popular Garden Hose tool in Fractal Design's software (Painter and Detailer), that lets you draw with images instead of just color. Pick the Letter Blocks option, for example, and start doodling. In a few seconds you will have a pile of blocks in 3D with drop shadows and other features you select. You can't create your own Picture Tubes, but the program includes more than 20 premade choices.

You can paint, too, with bitmap–based brushes that let you create such textured backgrounds as bricks and marble with a few drags of the mouse. And you can set transparencies, used in Web images, with a simple menu selection. Paint Shop Pro 5 supports dozens of image formats, including some pretty ancient ones.

A final note: Paint Shop Pro 5 supports Adobe Photoshop plug-ins, so migrating to it doesn't mean losing any existing investment you may have in Adobe work. Paint Shop Pro is not a tool for graphics pros, but most people will never know what's missing. And the price is right.

—Yael Li-Ron ▶

Paint Shop Pro 5

PRO: Powerful, easy for graphics.
CON: No high-end photo editing.
VALUE: Well worth the money.
Street price: $59, free trial version available on www.fileworld.com
Jasc Software
800/622-2793
www.jasc.com
READER SERVICE NO. 746

GPS NAVIGATION that's within reach.

DeLorme puts GPS Navigation within your reach for as little as $160—with DeLorme Tripmate™ and Street Atlas USA® 5.0 software. Connect to your laptop or download text route directions to your 3Com® PalmPilot™ (additional cable required from DeLorme). GPS voice navigation lets you hear spoken directions on your laptop as you drive. Available at your local retailer. Visit *www.delorme.com* to learn more or call 1-800-452-5931, use priority code CA020.

"*DeLorme Street Atlas USA* provides the best navigational tools. The leading products are closely matched in many areas, but DeLorme's robust support of satellite navigation and automatic route creation make this well-balanced program the best choice." —*National Software Testing Labs*

Circle 37 on reader service card

Technology is a race. Presenting the Official Pace Car.

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Introducing the 400MHz NEC Direction™ PC.

How committed are we to the highest performance and speed? The day Intel released their new 400MHz Pentium II processor, we unleashed it in a powerful new Direction PC. This features the highest-performance Intel processor on the market. Thanks to new system architecture, this new 400MHz chip boasts a 20% speed gain over the previous 333MHz. Setting new benchmarks in multimedia and 3-D graphics performance. And just so you know, this Direction PC optimizes the new processor in a way that nobody else's can. It offers the first available 100MHz system memory bus, for even faster applications, graphics, and video performance. And with names like Intel, Microsoft, U.S. Robotics, Iomega, 3Com and Diamond MultiMedia, the Direction components read like a who's who of high performance.

Direction SPB400

- **400MHz Pentium® II processor**
- ATX Minitower or Desktop Tool-Less Chassis
- **128MB SDRAM**
- 512KB L2 Cache
- **9.1GB Ultra ATA Hard Drive**
- 32X Maximum Variable-Speed CD-ROM Drive
- **Diamond Viper® AGP, 4MB SGRAM Graphics Card**
- Altec Lansing® ACS-410 Surround Sound Speaker System with ACS-251 Subwoofer
- PCI Wavetable Audio
- **U.S. Robotics® x2™ 56Kbps* Winmodem™**
- **NEC C900™ 19" Monitor (18" viewable, .26dp)**
- Microsoft® Windows® 95
- Microsoft Home Essentials™ 98
- Microsoft IntelliMouse®, NEC Palmrest Keyboard, and Microphone
- 3-Year Limited Warranty with 1-Year On-Site Service

Upgrades:

➤ DVD-ROM Drive and Decoder Card, add $279

$2799

Business Lease: $104/mo. Code #D5100

Direction SPB400

- **400MHz Pentium II processor**
- ATX Minitower or Desktop Tool-Less Chassis
- **64MB SDRAM**
- 512KB L2 Cache
- **4.3GB Ultra ATA Hard Drive**
- 32X Maximum Variable-Speed CD-ROM Drive
- 3.5" Floppy Drive
- **Diamond Viper AGP, 4MB SGRAM Graphics Card**
- Altec Lansing ACS-90 Speakers
- PCI Wavetable Audio
- **U.S. Robotics x2 56Kbps* Winmodem**
- NEC C700™ 17" Monitor (16" viewable, .27dp)
- 2 Universal Serial Bus (USB) Ports
- Microsoft Windows 95
- Microsoft Home Essentials 98
- Microsoft IntelliMouse, NEC Palmrest Keyboard, and Microphone
- 3-Year Limited Warranty with 1-Year On-Site Service

Upgrades:

➤ Upgrade to 128MB SDRAM, add $179

➤ Upgrade to NEC C900 19" Monitor (18" viewable, .26dp), add $249

$2299

Business Lease: $91/mo. Code #D5101

Comprehensive warranties, 30-day money-back guarantees, and 24-hour, 7-day-a-week technical support by trained NEC technicians.

Direction Add-Ons:

- Hewlett-Packard® DeskJet 694C Printer, add $239
- Hewlett-Packard LaserJet 6Lse Printer, add $399
- Iomega® 100MB Internal Zip™ Drive with One Cartridge, add $99
- U.S. Robotics x2 56Kbps* Modem with Data/Fax/Voice Features, add $99
- DVD-ROM Drive, add $279
- ***Free Microsoft Windows 98 Upgrade Coupon Available with Purchase of any Direction PC***

Call now to order your customized PC. **1-888-863-2669**

www.necnow.com Mon-Fri 8am-8pm EST Dept. No. PW774A

<enter here>℠

NEC

Code 174 on reader service card

E-Mail List Manager: Helpful but Costly

E-MAIL

I SAY BULK MAIL, you say spam. True, not everyone likes online mailing lists. But sending batch e-mail messages can be a great way to distribute a newsletter, announce a product update, or stay in touch with customers. If you need to send mail to a large number of people, Brooklyn North's **Email Postal Software** can help you build a list, manage the addresses, and e-mail everyone included on it. It certainly isn't cheap, but it could save you a whole lot of time.

The software costs a hefty $250 as a download or $265 for a CD-ROM with manuals. It uses wizard menus to walk you through the process of extracting addresses, building and customizing a list, and mailing. The program pulls the addresses from documents you already have—your e-mail program's in-box, a database, or a Web page, for example.

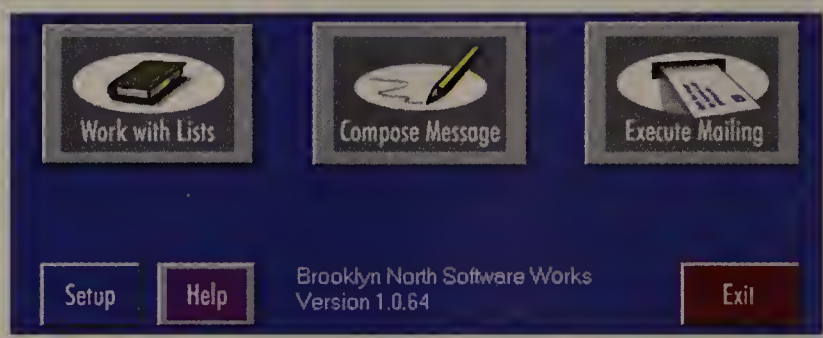
After building your address database, you can add or edit entries. The program automatically drops multiple entries, pulls out the names of desired recipients (if it can find them), and puts them into separate cells in the database. A preproduction version of the program proved capable of recognizing that JULIO_IGLESIAS, Julio_Englasias@suave.com, Iglesias, and Julio should all be entered into the database as Julio Iglesias. If the program isn't sure what to do, it will ask you to confirm that the entry is a duplicate—so you won't pester the folks you've mailed before with multiple copies of the same message.

Using the name extraction feature, you can start each letter 'Dear *user name*' for a personal tone. I found the program intuitive and its wizards clear and conversational.

Nonetheless, I do have a few criticisms. For instance, you must delete e-mail addresses one by one when editing your list. And when editing entries, you can't tab to the next category. Finally, the included e-mail editor is a bare-bones tool with few features: It can't check spelling, and it doesn't support attachments.

Features like attachment support are planned for the next version. But if you need a mass mailing now, Email Postal Software does the job.

—*Paul Heltzel*



TIMESAVER: BROOKLYN NORTH'S Email Postal Software simplifies online batch mailings with an easy, wizard-based interface.

Email Postal Software

PRO: Great wizards make work easy.
CON: No spelling checker or support for attachments.
VALUE: Pricey, but does the job.
Street price: download $250, CD-ROM version with manuals $265
Brooklyn North
902/425-0900
www.brooknorth.com/eps.html
READER SERVICE NO. 748

Computhink Helps End the Office Paper Chase

PRODUCTIVITY

DROWNING IN a sea of paper while you await the promised but ever-elusive advent of the paperless office? If you need to scan, store, and share large volumes of documents, you'll find that Computhink's $2500 **The Paperless Office Network Edition 2.0** for Windows NT works well for a corporate intranet. I tested a shipping version.

Structured on a 32-bit SQL database, The Paperless Office enables you to create an electronic filing system composed of areas, cabinets, drawers, and folders. You can use document index keys (numbers, titles, dates, IDs) to manage and search a bank of more than 100,000 multipage documents. In addition to accepting scanned documents (from any TWAIN- or ISIS-compliant scanner), the program's database stores e-mail, faxes, and Web-based documents.

Like any sophisticated document management application, The Paperless Office also offers fine annotation features with text and drawing tools, and optical character recognition (Xerox TextBridge Classic OCR) for converting scanned documents into editable text.

I found the program useful, though it took me a while to get used to its modular approach to document management, which divides image scanning, retrieval, and storage functions into separate areas. Notably, The Paperless Office lacks the Boolean logic and fuzzy search capabilities that would have enabled me to find specific documents more easily; Computhink has stated that it will add these features to the next version.

The Paperless Office stands out from its document management and OCR competition with client-server network features, including multilevel user privileges. A $70 single-user version of The Paperless Office is also available, but I suspect that many small-office and home-office users will find Visioneer's $100 PaperPort Deluxe a bit easier to use.

—*Richard Jantz* ▶

The Paperless Office Network Edition 2.0

PRO: Heavy-duty document management for workgroups.
CON: Complex interface, no Boolean logic or fuzzy search capabilities.
VALUE: Reasonable for managing documents on an intranet.
Street price: network version from $2500 (for five users), single-user version $70
Computhink Inc.
800/988-4465
www.computhink.com
READER SERVICE NO. 749

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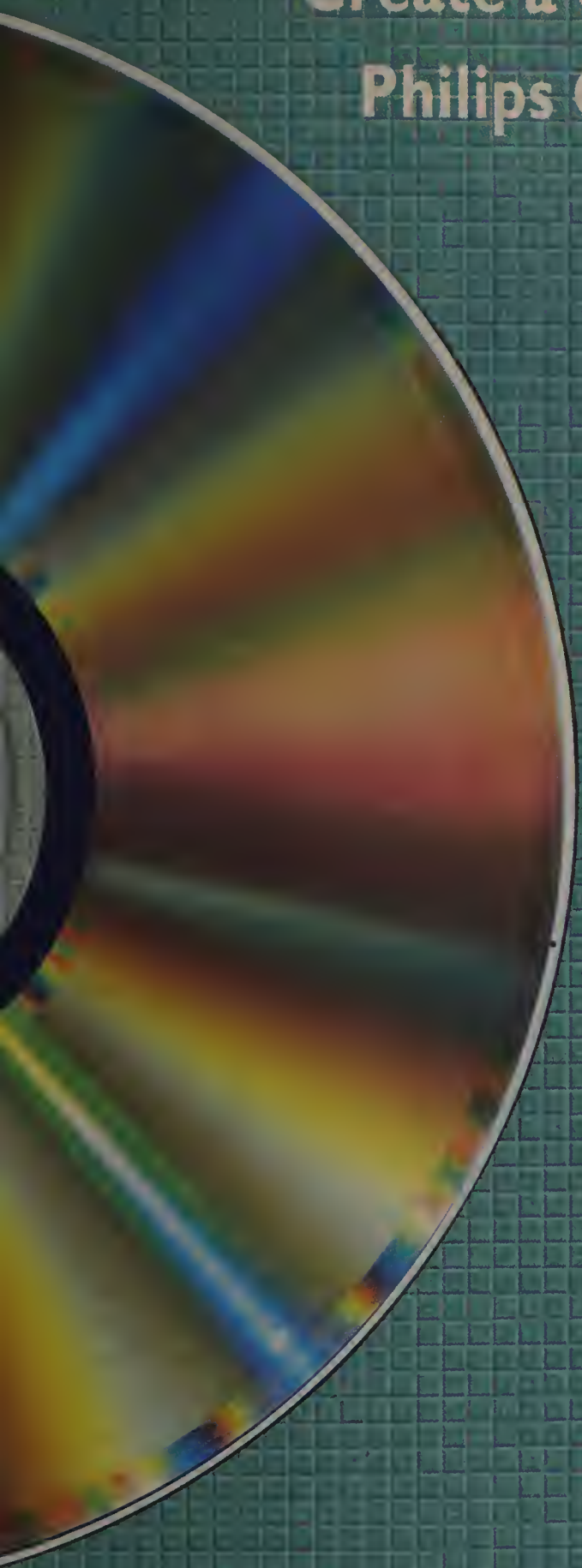

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PC MAGAZINE EDITORS' CHOICE

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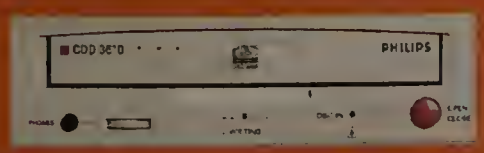

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Bargain 36-Bit Scanners: Not for Everybody

SCANNERS

THE LATEST NEWS in color scanners is not about rock-bottom prices: It's about next-generation bargains. New flatbed scanners from Mustek and Microtek Lab feature 36-bit color and 600-by-1200-dots-per-inch resolution—the first to offer these specifications at a street price of $200 or less. But the difference in quality between these scanners and their $99 30-bit, 300-by-600-dpi competitors isn't always noticeable. Casual users, therefore, may not want to spend the extra money, while people who enlarge and tweak photos regularly may find the investment worth making.

I reviewed preproduction versions of Mustek's $199 **Plug-n-Scan 1200 III EP** and Microtek Lab's $179 **ScanMaker X6.** Both units are TWAIN-compliant, with parallel port installation and printer passthrough. Ease of installation depends on such particulars as your computer's BIOS and age and your parallel port settings; I didn't have a problem.

BUNDLED UP: Microtek's ScanMaker X6 offers 36-bit color and a slew of software, including PhotoImpact and Kai's Photo Soap.

The Microtek has buttons to power the device on and to launch its scanning software (which works only with Windows 95). The Mustek offers to launch its software whenever you lift its lid—which can be irritating at times.

Nonetheless, I found the Plug-n-Scan's scanning software easier to use than Microtek's somewhat confusing ScanSuite program. In ScanSuite, I had to search for the scan settings window, and the bundled software did not appear in the applications toolbar (you can add the programs manually, but it's hardly an intuitive process).

Both machines produced good-looking scans with colors that seemed more brilliant than those generated by even a top-notch $99 scanner such as Storm's EasyPhoto ImageWave. Surprisingly, however, in at least one instance the ImageWave caught detail that the Mustek beta didn't, probably because of differences in their respective built-in photo enhancement processes.

Microtek's fine applications bundle includes Ulead's PhotoImpact 4.0 (a very good low-end image editing package), a limited edition of the Caere OmniPage OCR program, the DocuMagix PaperMaster document manager, and Kai's Photo Soap morphing software from MetaCreations.

Mustek packs Micrografx's Picture Publisher photo retouching software (for Win 3.1 and 95), Ulead's IPhoto Plus 4 (for Windows 95 only) for publishing photos, and Xerox's TextBridge Classic OCR (a short version of TextBridge).

Overall, I found the ScanMaker a better deal. But if you don't require these models' higher resolution and color depth for sophisticated graphics, a good 30-bit scanner should work equally well.

—*Yardena Arar* ▶

Plug-n-Scan 1200 III EP

PRO: Fast, affordable 36-bit, 600-by-1200-dpi scans.

CON: Loses some fine detail.

VALUE: Crisp, bright colors, but do-it-yourselfers may not like image enhancement trade-off.

Street price: $199

Mustek Inc.

800/468-7835

www.mustek.com

READER SERVICE NO. 750

ScanMaker X6

PRO: Cheapest 36-bit color scanner yet, excellent software bundle.

CON: Clunky scanning software.

VALUE: A good deal for people who routinely edit or enlarge photos.

Street price: $179

Microtek Lab Inc.

800/654-4160

www.microtekusa.com

READER SERVICE NO. 751

MUSTEK MISTAKE? The $199 Plug-n-Scan produced crisp, colorful images but wiped out some detail picked up by a $99 competitor.

QUICK TAKES

Toshiba's Easy-Open PCs

THE WAY most desktop PCs are constructed, getting inside the case can be hazardous to your fingers and your back. Toshiba has taken a novel approach to this problem with its new **Equium 7000** corporate PCs. The compact and full-size desktops in this line both have a handy hinged door on the side, through which you can add memory or peripherals cards and even replace the motherboard. Never again need you lift that heavy monitor off your PC for servicing and upgrading—which just might save you a trip to the chiropractor later. On the compact Equium model, a swing-out foot permits you to set the box on its side, like a tower. The full-size desktop Equium, for its part, does not need a foot to work as a tower unit. Street prices start at $1299, not including a monitor. Toshiba, 800/334-3445, www.computers.toshiba.com.

READER SERVICE NO. 752

—*Tracey Capen*

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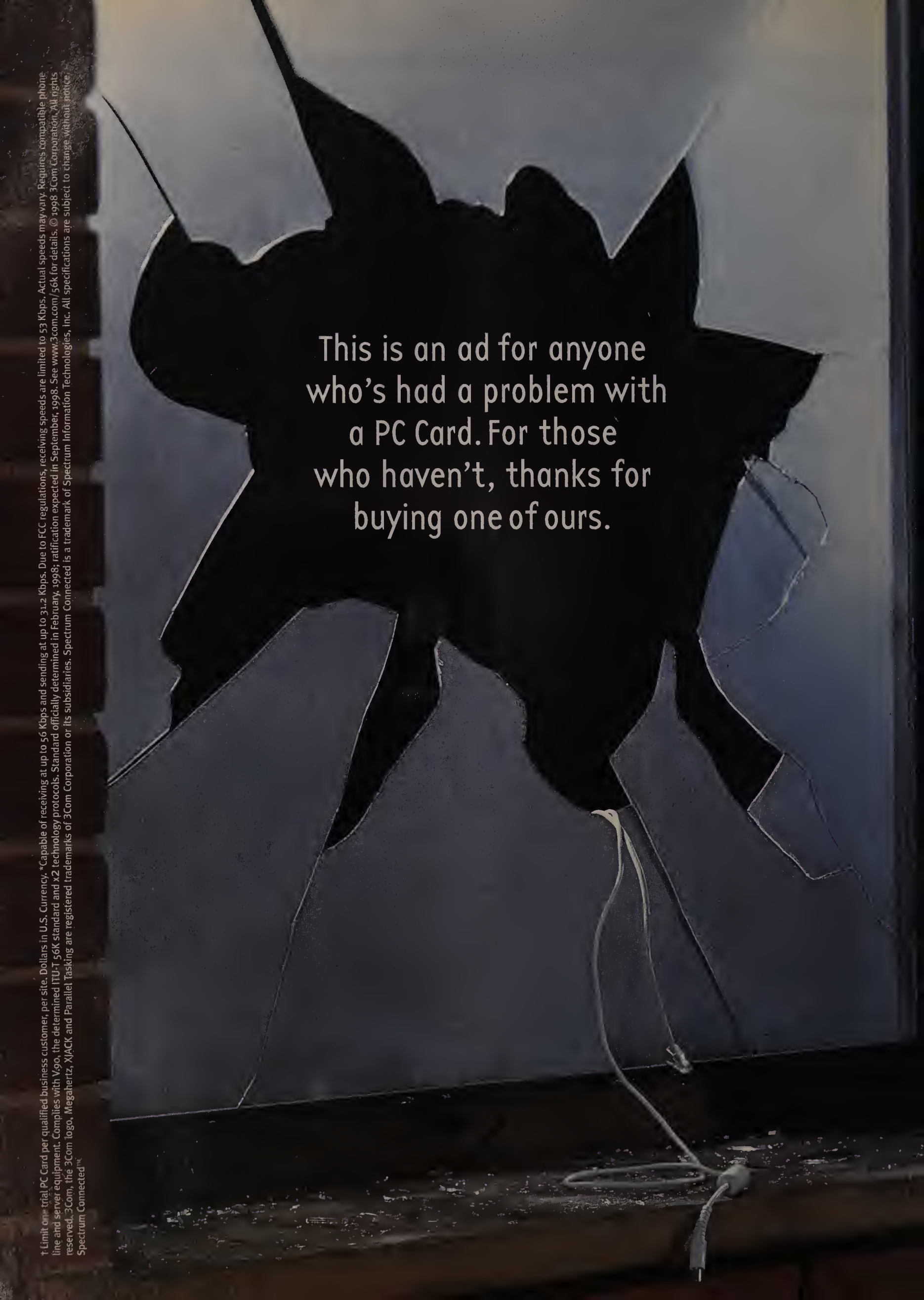

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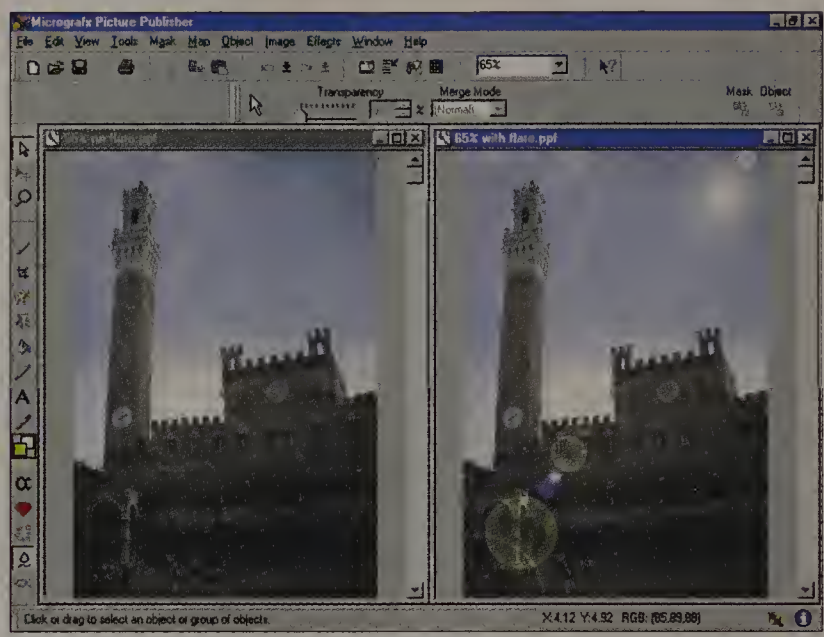
Picture Publisher 8: Pretty, but Not Perfect

GRAPHICS

ADOBE PHOTOSHOP may be the publishing professional's favorite for image editing, but many business users, Web designers, and digital photography buffs prefer a simpler digital darkroom. Micrografx's $149.95 **Picture Publisher 8,** part of a growing group of versatile and affordable image editors, is well suited for creating Web graphics and special effects. But its interface has some rough edges compared to its competitors. I tested a preproduction copy.



SPECIAL EFFECTS: Picture Publisher 8's new lens flare effect (in the right-hand window) simulates light entering a camera lens.

Picture Publisher 8

PRO: Excellent Web and special effects talents.

CON: Some interface and ease-of-use lapses.

VALUE: A feature-packed program, but not the best of the lot.

List price: $149.95

Micrografx

800/733-3729

www.micrografx.com

READER SERVICE NO. 753

For Web work, Picture Publisher 8 can create animated GIF files and Web image maps, complete with HTML tags. A new Web Styles Wizard provides dozens of canned Web-page designs, buttons, and backgrounds. Another plus: Picture Publisher 8 adds support for PNG and progressive JPEG graphics formats.

As for special effects, the interesting lens flare filter will have you groping for your sunglasses. The new Mosaic Tiles Effect transforms an image into a collage of textured tiles, but it is less convincing than the counterpart feature included in MetaCreations' Painter. Picture Publisher's intriguing Light Studio adds dramatic lighting effects, including adjustable spotlight beams, and the Bevel Factory creates 3D beveled buttons and 3D text.

The updated Media Manager provides drag-and-drop access to a large bundled library of stock photographs and background textures. You can also generate HTML-based or graphical contact sheets with thumbnail versions of a collection of images.

On the negative side, Picture Publisher 8 often feels cumbersome: Various common tasks simply require too many commands or mouse clicks. Design lapses include a lack of control over text leading or spacing, and some program elements don't work as expected. For example, you can't edit text by dragging across it.

Feature for feature, Picture Publisher 8 certainly holds its own among image editors. But when you factor in design implementation, it doesn't stand out—particularly against such competition as Ulead's similarly priced PhotoImpact 4, which has fewer features but a superior interface.

—Jim Heid

Corel Ventura 8: Faster, Fine-Tuned Publishing

DESKTOP PUBLISHING

THANKS TO improved performance and some new features, the $589 **Corel Ventura 8** impressed me far more than the previous version of this veteran desktop publishing program. Current Ventura users should find this complete 32-bit rewrite for both Windows 95 and NT a worthy $199 upgrade. But it still isn't special enough to make PageMaker or QuarkXPress users switch.

My experience with a prerelease version indicates that Ventura 8 has improved the speed of file loading and saving, printing, and screen redrawing. The enhanced toolbars and streamlined dialog boxes take you quickly to commonly used features.

Ventura's new Tag Window makes document formatting easier: To apply a style tag to a page, frame, paragraph, or character, simply drag and drop the tag onto the object. Corel also bolstered Ventura's Internet features, with new options for including hyperlinks, HTML frames, and image maps in Web documents.

Like earlier Ventura versions, V8 carries other Corel applications (such as Photo-Paint 8), plus fonts and clip art. But some older Ventura components (CorelWeb.SiteBuilder and CorelDepth, for instance) are no longer bundled.

If you need a professional DTP package, Ventura 8 remains a good choice. But its high price suggests that casual users would be better off with a cheaper, easier-to-use program like Microsoft Publisher.

—Richard Jantz ▶

Corel Ventura 8

PRO: Faster, streamlined interface.

CON: Some older modules (CorelWeb.SiteBuilder, CorelDepth) are no longer included.

VALUE: Worthwhile upgrade for Ventura fans.

Street price: $589, upgrade $199

Corel Corp.

800/772-6735

www.corel.com

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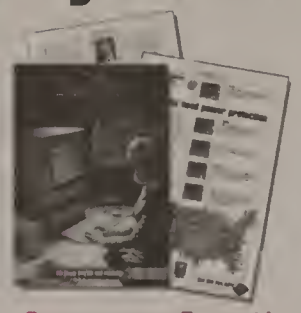

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Zinnote: Good Reports From Many Sources

REPORTING

ARE YOU TIRED of striking out when you try to access current information from several different PC databases? In your quest for a query-and-reporting tool, take a look at **Zinnote 5.0,** a new $995 program for Windows 95 and NT from Positive Support Review.

Zinnote 5.0

PRO: Accesses many types of data, easily maintains current data, creates great charts.

CON: Interface not always perfect.

VALUE: Useful tool for generating reports from many data sources.

Street price: Single user $995, five-user pack $2795

Positive Support Review

310/453-6100

www.zinnote.com

READER SERVICE NO. 755

Zinnote is not the ultimate in reporting tools, but it fills a niche for projects where the data exists on multiple sources. The program works with formats such as Access, dBASE, Excel, CSV, Btrieve, FoxPro, Paradox, and text. Zinnote does well at keeping information current: One mouse click traces data links and updates report information accordingly. This keeps your picture of the various pieces of your business up-to-date.

I tested a shipping version. The product tutorial detailed the necessary topics, though it did jump around the screen a lot. Because the tutorial is large (85MB), you can run it from the installation CD-ROM. A smaller tutorial, minus the audio, would be worth incorporating in the product help menu for quick reference.

I found creating reports to be relatively easy. Zinnote's interface for the chart and report definitions could be made more intuitive, but it's workable. The chart definition screens include a combination of over 100 charts and subcharts for a wide variety of customization options.

Little security is available inside Zinnote 5.0 for completed reports: You'll need to use your existing network management software. Unlike Seagate's Crystal Reports, Zinnote isn't integrated with a complete line of development products; but if you just need a query-and-reporting tool, Zinnote is very much up to par.

—Jennifer Schmidt

QUICK TAKES

Multiple OS Option

IF YOU'VE installed more than one operating system on your PC—or would like to install a second version of an OS (say, for games)—Alpha Software's $40 System Selector offers an economical alternative to V Communications' $70 System Commander Deluxe. This utility lets you pick the operating system you want at boot-up. Because System Selector works off a bootable floppy, however, it is less convenient for regular use (System Commander runs on your hard drive). You'll also have to do your own disk partitions and system installations—a deficiency that makes System Commander Deluxe (which handles these jobs for you) a slightly better deal overall, in our opinion. Alpha Software, 800/451-1018 ext. 117, www.alphasoftware.com.

READER SERVICE NO. 757

—Yardena Arar

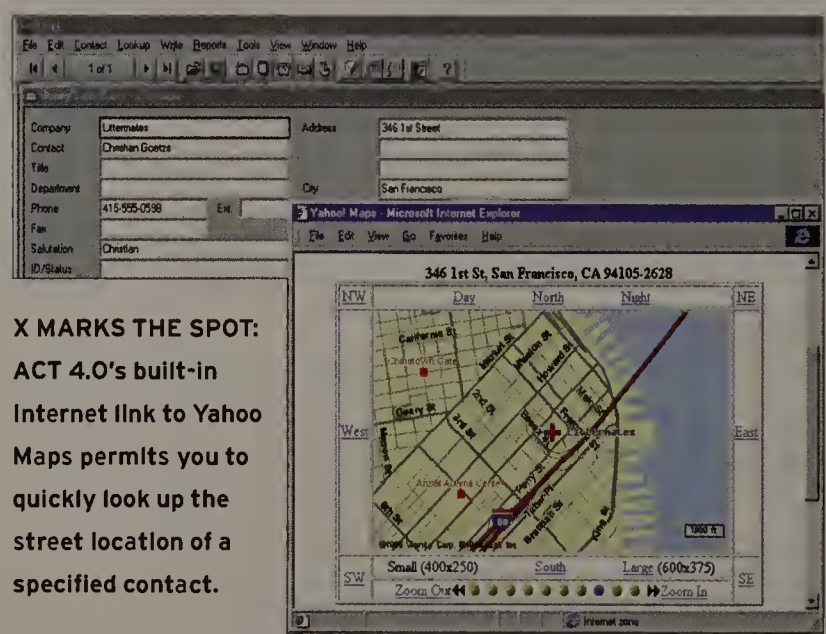
Play It Again, Symantec: ACT 4.0 a Real Classic

CONTACT MANAGER

CONTACT MANAGERS offer you a great way to keep tabs on crowds, but they're often difficult to master. **ACT 4.0,** the new $200 version of Symantec's veteran package for Windows 95 and NT, includes some outstanding multimedia tutorials for novices and is well worth the $90 upgrade price for current users. I examined a preproduction version.

The most visible addition: SideACT, a miniapplication that sits in the Windows 95 Taskbar, ready to be called up instantly. It lets you quickly jot down to-do items for later transfer to the main program.

You can now both send and receive e-mail (from POP3/SMTP servers) directly from within ACT, or via Eudora Pro. WinFax Pro users can now fax directly from—or attach faxed images to—contact records.



X MARKS THE SPOT: ACT 4.0's built-in Internet link to Yahoo Maps permits you to quickly look up the street location of a specified contact.

Internet links add further value to contact information: Click on *Yahoo Maps,* for example, and you'll see a street map that shows the location of the current contact.

Large enterprises may want to spring for the telemarketing and forecasting tools provided by ACT competitor GoldMine 4.0 (see *New Products,* April, page 96). But for individuals or small groups that need basic contact management with a gentle learning curve, Symantec has the class ACT.

—Yardena Arar ▶

ACT 4.0

PRO: Great multimedia tutorials, instant assistant, improved e-mail.

CON: No telemarketing or forecast tools, not best for large enterprises.

VALUE: Excellent for small groups and individuals.

Street price: $200, upgrade $90

Symantec Corp.

800/441-7234

www.symantec.com

READER SERVICE NO. 756

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[1]4X Max CD-ROM drive data transfer rates may vary from 1500 to 3600 Kbps. [2]The K56flex protocol is designed only to allow faster downloads from K56flex compliant sources. Maximum achievable download transmission rates currently do not reach 56 Kbps and will vary with line conditions. [3]14X Max CD-ROM drive data transfer rates may vary from 1200 to 1800 Kbps. All Compaq products sold at Compaq Works are refurbished unless otherwise noted. Our selection of refurbished products includes customer return units, evaluation units, cosmetically blemished products and older discontinued products. All refurbished products are retested at Compaq, where replacement of components is made, if necessary, to bring the product up to fully functional condition. All refurbished products carry a 90-day limited warranty and may be taken to any Compaq Authorized Service Agent for service. All excess new products carry the Compaq standard limited warranty. For a complete copy of our warranties, please write Compaq Works, 10251 N. Freeway, Houston TX 77037. Compaq Works shall not be liable for technical, pictorial or editorial errors or omissions contained herein. Product availability limited to products on hand. All prices shown are Compaq Works prices and do not include applicable state and local sales tax or shipping to recipient's destination. All sales FOB Houston. Prices subject to change. Compaq, Presario and the Compaq logo are registered in the U.S. Patent and Trademark Office. The Intel Inside logo and Pentium are registered trademarks and MMX is a trademark of Intel Corporation. Other product names mentioned herein may be trademarks and/or registered trademarks of their respective companies. © 1998 Compaq Computer Corporation. All rights reserved.

PCW0598

PowerDesk Utilities 98: Cool Tools, Low Price

UTILITIES

NOW AND AGAIN, a utility comes across my desk that fundamentally changes how I work. These come in two varieties: utilities that offer a better, faster way to do things; and those that crash my system, wipe out my customizations, and just make me want to cry. **PowerDesk Utilities 98** is one of the former. For $40, this generous package of tools and system utilities is among the best time-savers I've ever run into.

I tested the fully functional 30-day trialware version, available for download at Mijenix's Web site. The package's main component, the PowerDesk utility, is a powerful file manager that replaces Windows 95's creaky Explorer. PowerDesk's viewer pane expands on Windows 95's native Quick View utility: It can read more than 80 different file formats and allows text searching (in the file finder) and printing directly from the viewer. Easy-to-use encryption and electronic "paper-shredding" tools secure your files.

Another utility, PowerDesk Toolbar, helps you easily create customized system toolbars. These provide one-click access to almost anything—applications, printer controls, files—and can even display system diagnostics on the desktop.

POWERDESK UTILITIES 98 allows you to create custom toolbars for instant access to files and apps—and it monitors CPU performance.

One disappointment is an unwieldy hard drive tool called the Size Manager.

PC novices are likely to find the package overwhelming, but experienced Win 95 users will like PowerDesk Utilities 98.

—Glenn McDonald

PowerDesk Utilities 98

PRO: Time-saving utilities, great customization options.

CON: PC novices may well get lost in all the options.

VALUE: Clearly worth the price.

Street price: $40

Mijenix Corp.

800/645-3649

www.mijenix.com

READER SERVICE NO. 758

QUICK TAKES

Start-up Trick

THE DOCUMENTS option in the Windows 95 Start menu offers quick access to the last 15 documents you've opened; but you may not recognize a document's name on the alphabetized list. A new shareware utility, Recent Documents 97, lets you sort documents in other ways—by date of last access, by file type (a Word or HTML file, say), by the containing folder, or by user-defined categories. You can also change the number of documents the program tracks, ignore whole categories, exclude specific documents, or prevent selected documents from being bumped by newer ones. The program has a pleasant Explorer-like interface and costs $20 (plus a $3 shipping and handling charge, which the company waives if you order online). Insight Software Solutions, www.wintools.com.

READER SERVICE NO. 760

—Yardena Arar

Aladdin FlashBack: A Safety Net for Documents

UTILITIES

CALL IT CRASH protection: **Aladdin FlashBack,** a new Windows version of a popular Mac recovery tool, will save you some hand-wringing if you ever lose, overwrite, or delete precious files. Street-priced at $70, FlashBack does have a downside: It offers no way to automatically track all files created by a particular application or all files in a particular folder. Instead, you have to drag and drop individual documents into the FlashBack window.

When you drag a file into this window, FlashBack automatically identifies the file's application and creates a mini-directory listing the application, the file, and its revisions. You can set FlashBack to save each time a document is modified and saved or whenever it is modified and closed. You can also specify how often you'd like FlashBack to save—in minutes, hours, and days.

Revisions are organized chronologically by date and time, and you can keep up to 999 revisions. If you exceed this number, FlashBack will delete the oldest revision in favor of the most recent.

To see an old version of a file, double-click it. FlashBack will launch the file's application, if it's not already running.

Once you've renamed a file or deleted a document by putting it into the Recycle Bin, FlashBack will display a triangular yellow icon next to that file in its window. If the file you're working on is on a CD-ROM or floppy, the warning icon will appear by that file when you eject the CD or disk. What if you delete a file by accident? FlashBack keeps revisions of deleted files until you remove them from the FlashBack window directly.

The amount of disk space FlashBack requires depends on the size of your files and the extent of the edits you make. But note that the application saves only data that has been altered, not the entire document. When you open an old document, FlashBack makes a copy of the current working document and "adds" the difference to create the file you want to see.

It's not perfect, but FlashBack does provide a safety net.

—Lisa Moskowitz ■

Aladdin FlashBack

PRO: Tracks revisions of files.

CON: Takes elbow grease, a bit pricey as individual utilities go.

VALUE: A safe choice overall, but not ideal.

Street price: $70

Aladdin Systems

408/761-6200

www.aladdinsys.com

READER SERVICE NO. 759

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$1737.86 CDW 100405

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150MHz INTEL PENTIUM® MMX

IBM Business Partner ThinkPad® 380D

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- Intelligent Manageability
- Windows® NT Workstation V4.0
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Deskpro 2000

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- Integrated S3/V2 enhanced 64-bit graphics
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- 166MHz Intel Pentium® processor with MMX™ technology
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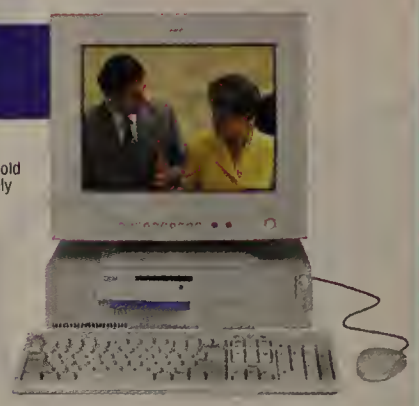
- LANdesk client manger
- Windows® 95
- 3-year limited warranty

$859.38 CDW 89298

266MHz INTEL PENTIUM® II

IBM Business Partner

Monitor sold separately



IBM PC 300GL

- 266MHz Intel Pentium® II processor
- 512KB Level 2 cache
- 32MB SDRAM standard
- 2.5GB Ultra ATA hard drive
- 64-bit AGP graphics
- Wake on LAN™ enabled
- Windows® 95
- 3-year limited warranty

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200MHz INTEL PENTIUM® MMX

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- 200MHz Intel Pentium® processor with MMX™ technology
- 256KB Level 2 cache
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- Windows® 95
- Mini-tower case
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300MHz INTEL PENTIUM® II

HEWLETT PACKARD — Expanding Possibilities

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- 300MHz Intel Pentium® II processor
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COMPAQ

Deskpro 2000

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- 16MB SDRAM standard
- 2.1GB EIDE hard drive
- Integrated S3/V2 enhanced 64-bit graphics
- Windows® 95
- Intelligent Manageability
- 3-year limited warranty

$947.76 CDW 101308

HEWLETT PACKARD — Expanding Possibilities — PRICE DROP

HP Vectra VE 4 PC

- 233MHz Intel Pentium® processor with MMX™ technology
- 256KB Level 2 cache
- 16MB SDRAM standard
- 2.1GB Ultra ATA hard drive
- Integrated Trio64 enhanced 64-bit graphics
- Two USB ports
- Windows® 95
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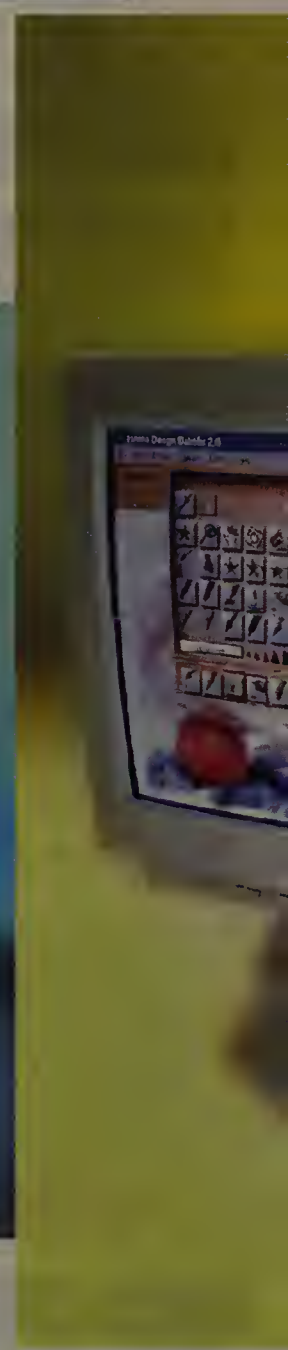


COVER STORY

- BARGAIN-BASEMENT PC: HP Pavilion 3260
- BUDGET SYSTEM: NEC Direction 266L
- POWER DESKTOP: Micron Millennia XKU
- NT WORKSTATION: Intergraph TD-225

PHOTOGRAPHS BY ROBERT OLDING

C

By Mike Hogan LET'S BE HONEST HERE: If money were no object, we'd all grab the ritziest PC we could get our hands on. After all, an excess of processing power, RAM, and disk space never hurt anyone. And which of us wouldn't opt for a state-of-the-art flat-panel LCD monitor and theater-quality speakers if we could do ▶

Need?

so without having to worry about the cost?

In the real world, however, selecting a business PC requires trade-offs between the power we crave and the money our companies can sensibly spend. The CEO may get the latest and greatest, but it's a trickier balancing act for managers and cubicle dwellers, as well as those who work in small and home offices. Then there are administrative assistants and interns, who are lucky if they have reasonably current machines at all.

MORE CHOICES, FEWER LIMITS

THE GOOD NEWS IS that now more than ever, there's a PC to fit every need. On one end of the spectrum, the sudden boom in sub-$1000 systems means you can finally get a functional starter PC for that price. On the opposite end, Pentium II processors running at 300 MHz and up are letting $7000 Windows NT workstations take on tasks such as high-end CAD that were once the domain of $20,000 UNIX boxes. And there are plenty of choices for the majority of us who buy a system somewhere between those two extremes.

So which PC is right for you? And what about the other folks in your company with varying needs? To help you make sense of it all, we've taken an in-depth look at your current options. We began by dividing the desktop PC universe into budget systems (systems priced between $1000 and $2249) and power desktops ($2250 and up)—a slightly modified version of our monthly Top 20 Desktop PCs classes. We then carved two additional niches: bargain-basement PCs (Windows 95 systems priced under $1000) and Windows NT workstations (specialized machines selling for $3000 or more).

Using our new PC WorldBench 98 benchmark (see "PC WorldBench Gets Pumped Up" in this month's Top 100), we tested more than 80 PCs to determine what's typical at each price point. We also looked at alternatives to standard PCs—see "The Skinny on Thin Clients" and "Workstations With Alpha Inside."

Shopping for a PC would be a lot simpler if we could devise cut-and-dried rules, but ultimately the best we can do is give you broad guidelines. Bear in mind that PC speed is a relative thing. On the one hand, if you've been trying to create multimedia shows on an old non-MMX Pentium-133 system, you'll probably get a real speed boost with a new sub-$1000 PC—even though we don't suggest one for heavy-duty graphics. On the other hand, no PC will truly be fast enough until it can handle every task with *zero* delay.

SPECS AREN'T EVERYTHING

TO COMPLICATE MATTERS, PCs with similar specs can provide shockingly different performance, as you know if you follow our Top 100 reviews. So while we can give you general advice on what to expect from various chips and other technologies, it's vital to keep tabs on the Top 100 to learn how specific models stack up.

In the near future, Intel's 350- and 400-MHz Pentium II CPUs will surely push down prices for PCs based on lesser chips; the company is also readying the Celeron, a CPU for cheap PCs (see *Top of the News*). You could opt to bide your time before buying, but you have to weigh the dollars you'll save against the productivity you'll lose while you're circling the tower.

Whether you buy now or decide to wait a bit longer, a PC is out there with your name on it. We can help you zoom in on one that's got the features you need—and avoid paying extra for those you don't.

CHOOSE THE RIGHT PC FOR THE JOB

If you...

- do only casual e-mail, word processing, Web navigation, and other simple tasks.
- are on a tight budget and your alternative would be to stick with an older, even slower system.

You should consider a...

Bargain-basement PC (under $1000)
166- to 233-MHz Pentium MMX or AMD K6 with 32MB of RAM, 256KB or 512KB of secondary cache, graphics adapter with 1MB or 2MB of RAM, 2.1GB to 4GB hard disk, no or 14-inch monitor.

Unless you...

- need lots of expansion room or expect your PC to stay useful for a couple of years without upgrades.

If you...

- typically work in office suites, Web browsers, and other mainstream applications and are looking for a good value.

You should consider a...

Budget system ($1000 to $2249)
233- or 266-MHz Pentium MMX, Pentium II, or AMD K6 with 32MB of RAM; 512KB of secondary cache; 3D graphics adapter with 4MB of RAM; 4GB to 6GB hard disk; 15- or 17-inch monitor.

Unless you...

- routinely work with graphics applications or with large databases or spreadsheets.
- want the latest technologies (such as 333-MHz or faster Pentium II processors) right now.

If you...

- spend lots of time multitasking apps or using demanding programs such as graphics packages.
- want to stave off PC obsolescence as long as possible.
- just want the best of everything.

You should consider a...

Power desktop ($2250 and up)
Pentium II-300 or above with 64MB of RAM, 512KB of secondary cache, 3D graphics adapter with 4MB or BMB of RAM, 6GB to BGB hard disk, 17-inch monitor.

Unless you...

- have specialized needs that call for the extra muscle of an NT workstation.

If you...

- are a technical type who'd otherwise be using a costly, unfamiliar UNIX workstation for advanced tasks such as CAD.

You should consider a...

NT workstation ($3000 and up)
Single or dual Pentium II-300 or above with 64MB or 12BMB of RAM, 512KB of secondary cache, 3D graphics adapter with 8MB or 16MB of RAM, 6GB to 8GB SCSI hard disk, 17- or 19-inch monitor.

Bargain-BASEMENT PCs

HP Pavilion 3260

UNDER $1000

JUDGING FROM ALL THE attention they've been getting lately, you'd think that sub-$1000 PCs had just been invented. Actually, they've been around for years as a way for some vendors to unload aging, obsolete hardware on unsuspecting first-time buyers.

But the current crop of supercheap PCs is something else. Even sub-$800 systems like Hewlett-Packard's Pavilion 3260, IBM's Aptiva E16, and Compaq's Presario 2240 do quite a lot. True, most leave out the monitor, artificially lopping $200 or more off the sticker price by packaging an incomplete system. And you won't find speed demons here—with respective scores of 77 and 73, the HP and IBM are the two slowest units we tested with PC WorldBench 98. Even so, they're worth considering as a low-cost PC for an office worker with modest needs—say, an administrative assistant who does mostly word processing and e-mail.

Move up the food chain just a step to $999 systems like IBM's Aptiva E26 and Compaq's Presario 4540 (again, sans monitor), and you'll find machines that achieve WorldBench 98 scores in the 100-to-120 range—a 33 percent or better improvement on the pokey results of the Aptiva E16 and Pavilion 3260. That's still only about half as quick as the fastest PCs we've tested—logical enough, considering that they also cost roughly half as much as a power system, once you've added a monitor. These systems are perfectly adequate for Web browsing, light work in an application suite, and other simple tasks.

Tread carefully here, though, if you spend the bulk of your workday at a PC keyboard—especially if you subject your machine to moderately demanding tasks like working with presentations or wrangling large spreadsheets. You'll spend more time waiting while files load and dialog boxes pop up. And because most of these PCs have spotty upgrade potential, you may run into trouble when you need to expand your system.

JUST THE BASICS

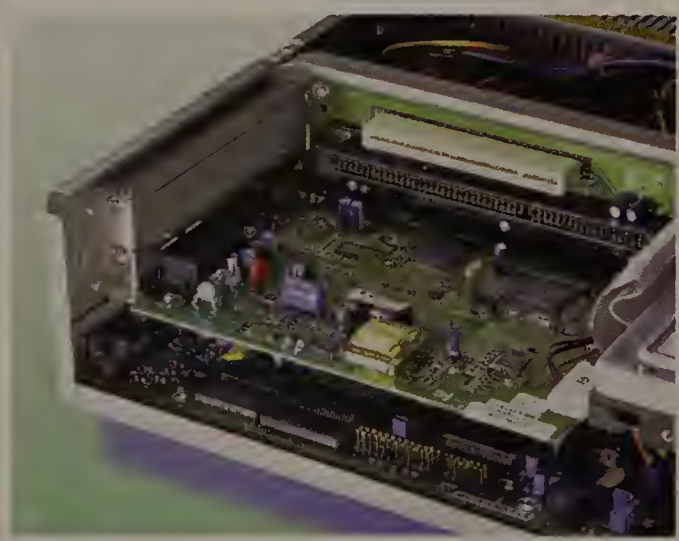
GENERALLY, bargain-basement PC configurations tend to be uniform and pretty basic. At both the $799 and $999 price points, most have 32MB of RAM, a 2GB-to-4GB hard disk, a 12X–16X or 12X–24X CD-ROM drive, a 56-kbps modem, and integrated audio. A 14-inch monitor is about $200 extra, a basic 15-inch model $350. A 17-inch display will cost almost as much as the PC itself.

PCs in the sub-$1000 class tend to be built around Intel's Pentium MMX or Advanced Micro Devices' K6 CPUs running at clock speeds from 166 to 233 MHz. However, good performance has just as much to do with memory—main memory, secondary cache, and video RAM—as with CPU speed.

Thankfully, even the cheapest PCs tend to come with a respectable 32MB of RAM these days, although IBM's sluggish $699 Aptiva E16 is still stuck with 16MB. But PC makers who market in this price range don't throw secondary cache around loosely—it costs about 50 times as much per kilobyte as main memory. You can see its importance in Seanix's $999 Baby Grande, a 200-MHz Pentium MMX system whose 512KB of secondary cache helped it run one-third faster in WorldBench tests than the same-price Packard Bell Multimedia S-606, which has a 233-MHz PMMX chip but lacks secondary cache.

Likewise, HP's Pavilion 3260 and Compaq's Presario 2240 have a parsimonious 1MB of graphics memory rather than the 2MB you'll find in better-equipped PCs in the same price range. Even if you never run a graphics application per se, good graphics performance is important at every level of the Windows environment, since it speeds up the rendering of on-screen menus, dialog boxes, and other elements in any program you use.

One other potential pitfall is that many sub-$1000 PCs have very limited room for expansion. HP's Pavilion 3260, for instance, has no open drive bays, ruling out even basic upgrades such as an internal Zip drive. The Pavilion also has ▶



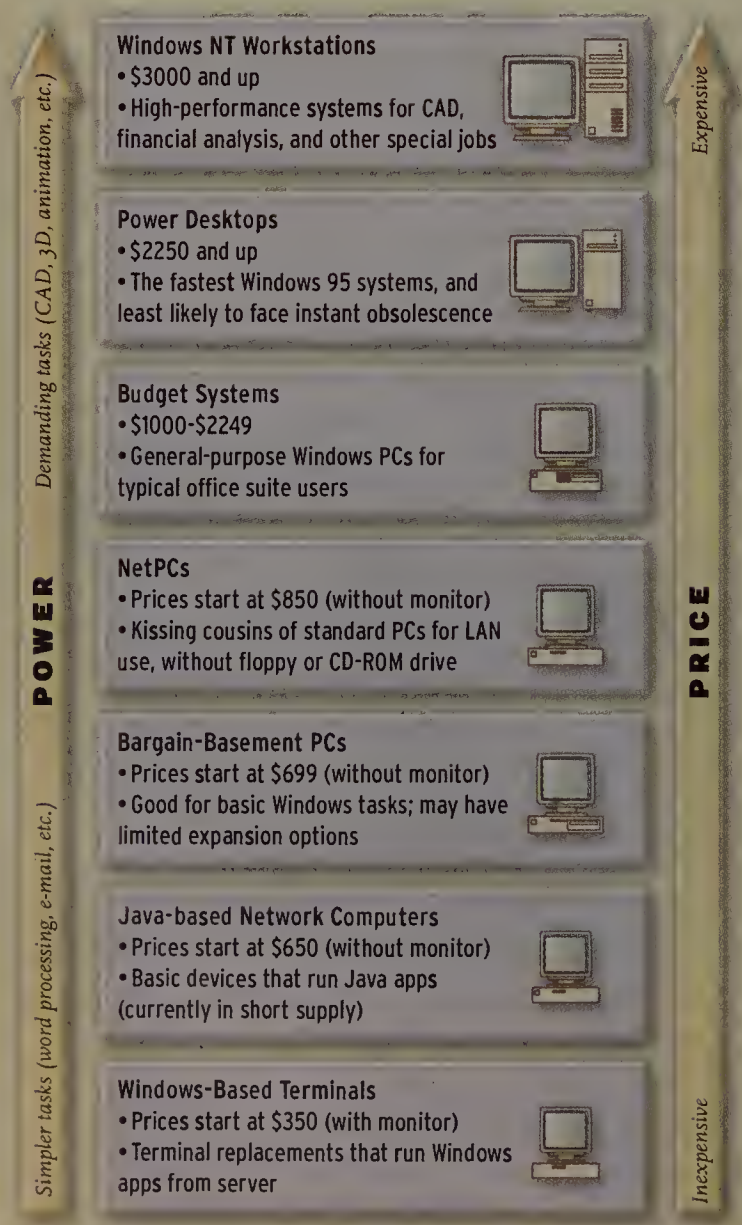
Sub-$1000 PCs such as HP's Pavilion 3260 often provide little room for additional RAM, drives, and other extras.

only one combination ISA-PCI slot free for future add-in cards such as a SCSI adapter. And while most PCs let you expand their RAM to 128MB or more, bargain-basement models often don't—Compaq's Presario 4540 maxes out at a mere 48MB, less than what many higher-price machines ship with in the first place.

The bottom line on these PCs: If money is tight, they're worthwhile alternatives to outmoded systems for workers who don't require much computing power. But if you need a PC that'll keep up with the ever-escalating demands of new software, think twice before shopping in the bargain basement. Without decent performance and elbow room for upgrades, a machine can't fend off obsolescence in the fast-forward PC culture for long.

PRICE VS. POWER

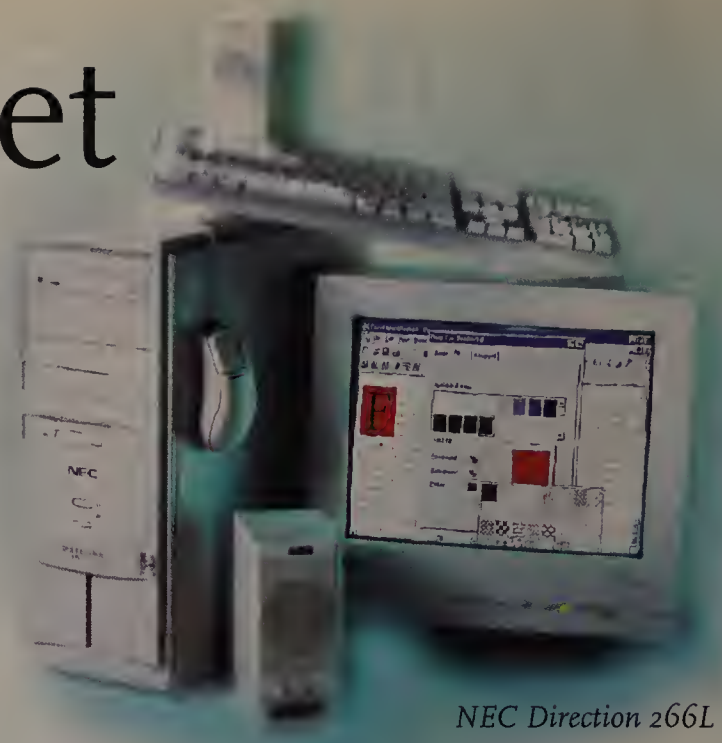
How much PC do the folks in your organization need? Or does everyone even need a PC? To help answer that question, here's an overview of how different systems compare, including both PCs and alternative devices.



Budget SYSTEMS

$1000-$2249

UNLESS YOU HAVE a tight budget and limited needs, it makes sense to step out of the bargain basement and shop among the next-pricier class of PC. The reason? As the market research firm Dataquest reports, 14 million Windows systems are forced into early retirement every year. In most cases, these computers haven't broken down or worn out. But the ever-ballooning demands of the Windows operating system and huge new applications mean that last year's top dog will usually run like a tired old hound this year.


NEC Direction 266L

Machines in the $1000-to-$2249 range are good picks for the great masses of typical users who primarily want their office suite, Web browser, and other workaday software to move along at a good clip, and who may dip into graphics packages and other more power-hungry applications from time to time. Generally, you won't find the newest chips, the biggest monitors, or the fanciest add-ons at this price level. You will get respectable performance and room for future upgrades, at prices that are cheap by historical standards—and, in fact, even by last year's standards.

A representative example of the budget breed: NEC's $1699 Direction 266L, a 266-MHz Pentium II system with a PC WorldBench 98 score of 156. That's almost 50 percent faster than Compaq's Presario 4540, one of the quicker sub-$1000 PCs we tested. So you'll get a real performance kick for just a little more cash, once you've factored in the cost of a monitor for the Presario. (Budget systems usually include a 15-inch monitor, and some come with a 17-inch display that may account for $700 of the price.)

Overall, PC WorldBench 98 scores for budget PCs tend to fall between 120 and 160; most of the fastest machines are Pentium II-266 systems with 64MB of RAM.

233-MHZ AND BEYOND

LOGICALLY ENOUGH, the cheapest budget PCs are often built around the same economy-model CPUs used in bargain-basement models. Move past the $1500 price point, though, and midrange chips dominate, including 233- and 266-MHz Pentium MMX, Pentium II, and AMD K6 CPUs. Near the top of this price range you'll bump into the occasional 300- or 333-MHz Pentium II system.

As with the bargain systems, it's not enough to focus just on a PC's processor and clock speed. No CPU can realize its full potential without a good supporting cast of components; and while better parts are usually associated with a faster processor, that's not a given.

Budget PCs typically come with 32MB of RAM, though 64MB is common in machines at the higher end of this price range. It's usually SDRAM (synchronous dynamic random access memory), which is 10 to 20 percent faster than the EDO

memory still used in many lower-price models. With Pentium II systems, 512KB of secondary cache is standard. Occasionally, you'll come across a budget PC with only 256KB of cache, such as HP's $1925 Vectra VE, a Pentium MMX-233 PC that runs like a sub-$1000 model.

Budget systems usually include a graphics adapter with 4MB (or better still, 8MB) of video RAM—more than adequate for good Windows performance at typical color depths and resolutions. Built-in 3D acceleration—a plus for game players and graphics enthusiasists, but a nonissue for most business users—is now standard except in systems targeted specifically for service as network nodes in big companies, such as Compaq's Deskpro line, Dell's OptiPlexes, and HP's Vectras; these machines may still have older, non-3D chip sets and only 2MB of video RAM. If so, you won't be able to run Windows in RAM-intensive modes such as 24-bit color at 1024 by 768 resolution.

A BETTER CLASS OF DRIVE

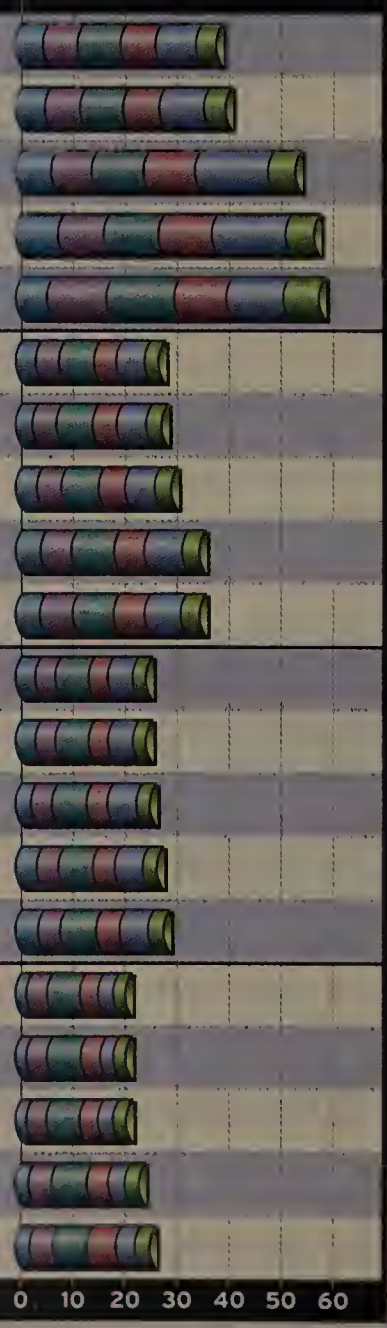
HARD DISK SIZES on budget PCs range from 4GB to 6GB, and the drives are usually connected to an integrated Ultra DMA/33 IDE adapter capable of 33-megabytes-per-second peak data transfers—twice the rate of older adapters. ▶

TEST REPORT

Paying a Premium for Performance

The fastest NT workstations are nearly three times quicker than the slowest cheap PCs.

	SYSTEMS	Price	CPU	Operating system	RAM (MB)	Secondary cache (KB)	PC WorldBench score
Bargain-Basement Systems	Acer Aspire 2840M	$999	AMD K6-233	Windows 95	32	256	112
	Compaq Presario 4540	$999[1]	AMD K6-233	Windows 95	32	256	108
	Packard Bell Multimedia S-606	$999[1]	Pentium MMX-233	Windows 95	32	–	83
	Hewlett-Packard Pavilion 3260	$799[1]	Pentium MMX-200	Windows 95	32	–	77
	IBM Aptiva E16	$699[1]	AMD K6-166	Windows 95	16	256	73
Budget Systems	NEC Direction 266L	$1699	Pentium II-266	Windows 95	64	512	156
	Gateway E-3110 266	$2118	Pentium II-266	Windows 95	64	512	152
	Dell Dimension XPS D266	$2199	Pentium II-266	Windows 95	32	512	142
	Unicent Avanta T233	$1799	Pentium MMX-233	Windows 95	64	512	122
	CyberMax PowerMax 3	$1449	AMD K6-233	Windows 95	32	512	120
Power Systems	NEC PowerMate Enterprise 8000	$2818	Pentium II-333	Windows 95	64	512	175
	Micron Millennia XKU 333	$2998	Pentium II-333	Windows NT 4.0	64	512	172
	Gateway G6-300	$2963	Pentium II-300	Windows 95	64	512	172
	Polywell Poly 700L5 PII 300	$2350	Pentium II-300	Windows 95	64	512	159
	Quantex QP6/300 SM-4x	$2549	Pentium II-300	Windows 95	64	512	151
Workstations	Hewlett-Packard Kayak XU	$6425	dual Pentium II-300	Windows NT 4.0	64	512	204
	Micron Powerdigm XSU	$4254	dual Pentium II-300	Windows NT 4.0	128	512	204
	Compaq Deskpro 6000T	$4000	Pentium II-300	Windows NT 4.0	64	512	202
	Dell WorkStation 400	$3907	Pentium II-300	Windows NT 4.0	128	512	179
	Intergraph TD-225	$6824	dual Pentium II-300	Windows NT 4.0	64	512	163



Word 97 · Excel 97 · Picture Publisher 7.0 · Paradox 8.0 · Word Pro 97 · 1-2-3 97

HOW WE TEST All systems are tested with PC WorldBench 98, *PC World*'s application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with either Windows 95 or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Excel 97 (20 percent), Picture Publisher 7.0 (20 percent), Paradox 8.0 (20 percent), Word Pro 97 (10 percent), and 1-2-3 97 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). [1]Without monitor.

You may encounter systems with disks as small as 2GB. But with hard drives going for less than $50 per gigabyte—and with software growing more bloated by the minute—an extra $100 or $150 for a 4GB or larger drive is a wise investment.

What other features can you expect to find? Look for a 12X–24X CD-ROM drive, and audio quality that's a step up from that of bargain-basement PCs (better-sounding speakers, perhaps, as well as an upscale sound card such as Creative Labs' AWE64). But most budget systems aren't laden with flashy gizmos. If luxury is what you're after, get your wallet ready and proceed to the world of power systems.

Power DESKTOPS

Micron Millennia XKU

$2250 AND UP

ADMITTEDLY, $2250 IS a somewhat arbitrary amount to use as a dividing line between budget and power systems. Still, when you move into this price territory you'll definitely notice a difference. Faster CPUs, more RAM, and brawnier graphics adapters give most of these systems PC WorldBench 98 scores in the 140-to-175 range; large monitors and other features to make work more pleasant are common. And these powerful PCs won't necessarily cost an arm and a leg: Most power desktops are priced under $3000.

Certain types of workers *need* a power system. People who spend a lot of time juggling multimegabyte data files—presentation mavens, graphic artists, and database gurus, for example—are prime candidates, especially if they like to leave many applications open and switch between them. Who could benefit from a power desktop? You, if you've ever sat drumming your fingers while waiting for something to happen in Windows, squinted for hours at an undersize screen, or found that, yes, you *can* fill up a 3GB hard disk without trying very hard.

THE LATEST AND FASTEST

AT THE MOMENT, power desktop configurations don't vary as much as those of more economical models. Just about all of them employ a 300- or 333-MHz Pentium II CPU; 350-MHz models should begin popping up at about the time you read this. At these speeds, there's a risk that a PC's buses will turn into bottlenecks. But the Pentium II has a dedicated 64-bit bus between the secondary cache and the processor core, one that's designed to keep up with the CPU.

Thanks to tumbling RAM prices, power systems almost always have a generous 64MB helping of memory, and if you're shopping in this price range you should get as large and fast a hard drive as possible: 6GB to 8GB units are the norm, though you'll occasionally find a system with a 4GB or smaller hard drive. In these cases, it's eminently sensible to spring for a drive upgrade to at least 6GB.

One reason that power systems are a smart choice for desktop publishers, artists, and other graphical types is that they usually sport beefy graphics adapters—3D cards with 4MB or 8MB of RAM are standard. Most use the Accelerated Graphics Port technology, which creates a dedicated channel so that the graphics card can access data directly and store it in the computer's main memory, at speeds two or more times faster than through the PCI bus. However, AGP primarily serves to boost the speed of 3D rendering, and our early tests suggest that it won't live up to its potential until applications are designed with it in mind.

MORE THAN RAW PERFORMANCE

IT'S TRUE that there's a fair amount of overlap between the performance of budget and power systems. A low-cost Pentium II-266 machine with 64MB of RAM can come within striking distance of typical performance for a power Pentium II-300 with 64MB. For instance, Gateway's $2118 E-3110 266 was only 13 percent slower in our PC WorldBench 98 tests than a $2963 configuration of the same company's G6-300 model.

It's important to remember, though, that PCs in this price range offer other amenities that set them apart from less-costly models. The Gateway G6-300 configuration we tested, for example, comes with a 19-inch monitor (compared to the E-3110 266's 17-inch model). It's got an 8GB hard disk—twice as capacious as the E-3110 266's 4GB—plus a DVD-ROM drive, high-end Boston Acoustics speakers, and a TV tuner card.

While DVD drives and 19-inch screens remain the exception, 17-inch monitors are standard issue here, as opposed to the 15-inch models still predominant among budget PCs. The bigger display is essential for graphic artists and counts as a big plus for the rest of us too, since it lets users work at high resolutions without eyestrain. You may also find such ▶

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- 5.0GB Hard Drive / 3.5" Floppy Drive
- 4MB EDO PCI Graphics
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- 24X Variable CD-ROM
- Zoomed Video Port, Video in Jack
- Fast Infrared Interface Support
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- NTSC Video Input / Output, Game Port
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desirable extras as network adapters, Zip drives, and ergonomic or programmable keyboards included with power systems.

NT VERSUS 95

AS YOU MOVE UP the power curve, you'll find an increasing number of power desktops that ship with Windows NT 4.0 as their operating system. Many NT systems are in the small group of PCs we've tested with WorldBench scores that surpass 170; thanks to NT's better memory management, a well-equipped machine will complete tasks faster with NT than with Win 95. NT is also less prone to crashes, and it offers considerably more security tools.

However, NT lacks Win 95's Plug and Play setup for peripherals, and drivers are not always available for printers and other devices. And while most new business ▶

THE SKINNY ON Thin Clients

Network Computers and Other PC Alternatives

BLOATED, UNRELIABLE, expensive, and unruly: Those are a few of the choice epithets that have been hurled at the traditional Windows PC, especially when it sits on a corporate network. A recent study by International Data Corporation concluded that, purchase price aside, maintaining each LAN-based PC costs a company nearly $10,400 a year once technical support, hardware and software upgrades, and various other costs are factored in.

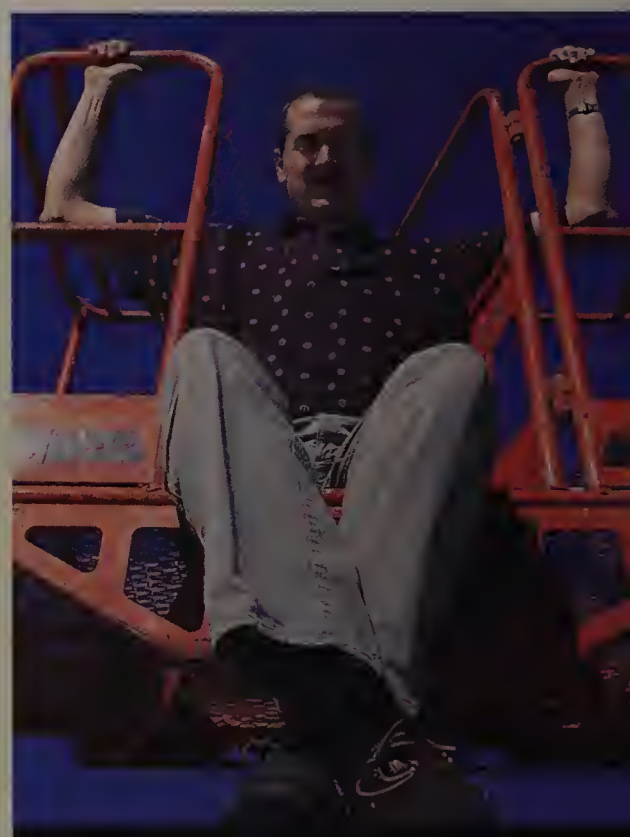
Enter a class of PC alternatives called *thin clients*. These simplified devices bear as much resemblance to the dumb terminals of yore as to today's complex, feature-rich PCs. They rely on a network and server to operate, so they can dispense with much of what makes a PC a PC, including a hard disk, a floppy drive, and even an operating system in some instances. That makes them at least a little cheaper to buy and, in theory, a lot cheaper to own. Users can't add nonapproved programs or infect thin clients with viruses, and IS staffers can do software installations once on the server, rather than on dozens or hundreds of individual PCs.

IBM's Network Station

Would you be more productive with a thin client than with a traditional PC? Probably not. By and large, thin clients are designed for workers who use a handful of programs for basic tasks (such as access to data on mainframes) and don't need to customize their working environment. Whether you'll be asked to use one is hard to say. While some analysts predict they'll catch on, a report by Zona Research found that just 15 percent of companies surveyed planned to adopt thin clients in the next three years.

Thin-client contenders. The highest-profile thin client is undoubtedly the Network Computer (NC), a Java-based device that Oracle's Larry Ellison first proposed in 1995. Three years later, NCs haven't made a noticeable dent in Windows' market share, in part because few of the units have shipped and Java business applications remain scarce.

NCs have found some fans, however, such as Travis Singleton, manager of technology development for Prime Equipment, a chain of 160 heavy-equipment rental dealerships based in Houston. Prime bought 700 IBM Network Stations for store staffers and other employees; by Singleton's reckoning, these NCs (priced from $649) cut the company's maintenance costs by 90 percent. "The Network Stations are basically bulletproof," he says.



Using NCs slashed Prime Equipment's maintenance costs by 90 percent, says Travis Singleton.

Windows slims down. As usual when a new product has Windows in its crosshairs, Microsoft is shooting back. By midyear it plans to ship Windows Terminal Server, a software product that lets programs run on a network server; workers use them through an NC-like device called a Windows-Based Terminal. Because WBTs don't have to do much more than render screens and accept input, they don't cost much—Wyse Technologies sells one for $349, complete with keyboard, mouse, and gray-scale screen.

Then there's the NetPC, another Windows-based device launched in mid-1997. Basically a Windows PC in a sealed case, with hard drive, network interface card, and network management software—but no floppy or CD-ROM drive—the NetPC shows no signs of taking off like wildfire. An early example is NEC's $1299 PowerMate Enterprise Net PC-233. The size of a large cereal box, it's got a Pentium MMX-233 CPU, 64MB of RAM, 256KB of secondary cache, and a 4.3GB hard drive. Its PC WorldBench 98 score is 135, within the range we would expect from a system with those specifications.

The NetPC's advocates make thin client-like claims about its ability to cut ownership costs. But "a NetPC is just a PC without a floppy," asserts John MacGilvary, director of research at the Gartner Group. "It's not an NC, not a thin client." Unlike NCs and WBTs, NetPCs have local disk storage—the root, he says, of most of the problems that make traditional PCs expensive to maintain.

—Mike Hogan and Harry McCracken

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software will run under NT, plenty of applications don't. Microsoft says that Windows NT 5.0, due for release in 1999, will fix some of these shortcomings.

If you're torn between a budget and a power system, take a moment to ponder what you expect to be doing with your PC this time next year—or the year after that. A power desktop that incorporates the best of today's technologies should be able to keep up with escalating needs (including fancier interfaces, richer content, and more resource-hogging software) for 24 months or so without major upgrades. That may not sound like much, but it's about the best you can expect from *any* PC.

Dell's dual-monitor WorkStation 400

NT Workstations

$3000 AND UP

ALTHOUGH POWER desktops are the beefiest systems you're likely to find running Windows 95, they're not the highest-end PCs around. That distinction belongs to Windows NT workstations such as Hewlett-Packard's Kayak XU and Micron's Powerdigm XSU. With features like dual 300-MHz Pentium II processors, SCSI buses, and other ultrafast parts, these are some of the speediest and best-appointed systems we've ever tested. The HP and Micron workstations are among the handful of systems with PC WorldBench 98 scores that break the 200 barrier—that's around 25 percent quicker than an average power desktop with a score of about 160.

Workstations aren't aimed at typical workers—even power users—who use only mainstream software. Rather, they target those who work in specialized, very demanding programs. Among the tasks that can benefit from a workstation: computer-aided drafting, scientific and financial analyses, animation, high-end image editing, and software development.

While you might find a low-end single-processor NT workstation for $3000, most workstations cost $4000 or more; add pricey extras, and you could pay $10,000. You can get HP's Kayak XU for $6425 with a 17-inch monitor, or Micron's Powerdigm XSU for $4254 with a 19-inch display. Their price tags may sound high, but these machines are a bargain compared to the systems they're designed to replace—UNIX workstations that sell for $20,000 or more. Better still, instead of being balkanized in the somewhat proprietary world of UNIX, you get Windows NT's familiar interface and a longer (though not all-inclusive) list of compatible software and hardware products.

ANATOMY OF A WORKSTATION

WHAT MAKES A PC a workstation rather than a power desktop? For one thing, while a power machine might run either Windows 95 or NT, there's really no such thing as a Windows 95 workstation. With the important jobs that get done on workstations, the key issues are usually performance, stability, and security—and those are just the areas where Windows NT shines. It's also the only version of Windows that is capable of harnessing the power of multiple processors.

NT workstations resemble power ▶

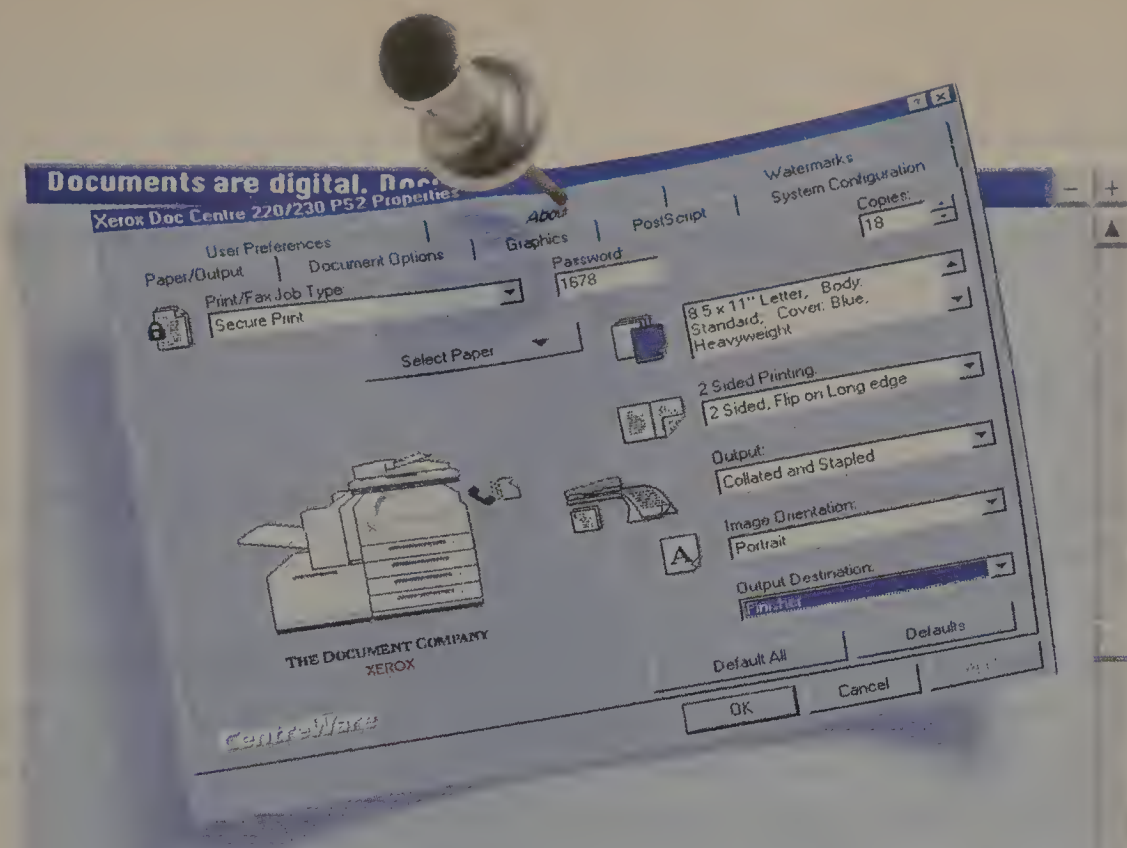
TEST REPORT

Workstation Graphics: 3D or Not 3D?

Heavy-duty graphics cards help Intergraph and Micron blast through modeling jobs.

Workstation	CPU	Graphics adapter	RAM (MB)	Graphics RAM (MB)	Comments
Dell WorkStation 400	Pentium II-300	Appian Jeronimo J2	128	4[1]	Financial workstation has single processor and non-3D graphics card.
Hewlett-Packard Kayak XU	dual Pentium II-300	Matrox Millennium II AGP	64	8	This Kayak model is tweaked for CAD users, not 3D animators.
Intergraph TD-225	dual Pentium II-300	Intergraph Intense 3D Pro 2200-T	64	16	16MB of graphics RAM helps system finish first in three of five tests.
Micron Powerdigm XSU	dual Pentium II-300	Diamond Fire GL 1000 Pro	128	8	Fire GL graphics adapter blasts through elaborate texture mapping in robot scene.

HOW WE TEST We tested Windows NT 4.0 workstations for 3D graphics performance using Caligari's TrueSpace3, with automated scripts that performed five representative tasks. The first script modeled and rendered an elaborate robot and background scenery, with extensive use of texture maps; the other four modeled a bird, a chair, a wood screw, and a truck. [1]Now ships with 8MB.



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WORKSTATIONS WITH Alpha Inside

WANT A WINDOWS NT workstation based on a 64-bit processor that runs at clock speeds of 500 MHz and beyond? You could wait until Intel finishes its next-generation CPU, code-named Merced and due to hit the market in late 1999. Or you could go out today and buy a workstation built around one of Digital Equipment's Alpha chips, the only CPU line other than Intel's *x*86 (and its clones) that runs NT.

1 GHz or bust. Once touted as the CPU that would shatter the Intel hegemony, Alpha has made only a modest impact since its 1992 launch. However, says chip analyst Mike Feibus of Mercury Research, "nobody questions that it's a superior technology." Alpha chips have long surpassed Intel's fastest processors in speed. Digital plans to ship a 600-MHz Alpha CPU this year, and a 1-*gigahertz* version is due out by the end of 1999.

Rapid rendering. Prices for 533-MHz Alpha workstations are in the same ballpark as those for Intel-based models. Digital's own workstations start at about $4000, and niche vendors such as Polywell and Tri-Star offer stripped-down systems for as little as $2000. These machines have a cult following among technicians and artists who use high-end 3D graphics software. "A model that takes half a day to render on a $2000 Alpha system takes a day and a half on our $6500 dual-CPU 300-MHz Pentium II Intel boxes," says Senter Reinhardt, a wireless-communications engineer in Huntsville, Alabama.

To date, only a handful of big-name software vendors have released Alpha editions: AutoCAD, CorelDraw, Microsoft Word and Excel, QuarkXPress, Ventura, and WordPerfect Suite are either shipping or in the works. Digital also supplies a translator that allows Alpha systems to run Windows 95 programs. While its users report few problems and say the speed is akin to that of a 233- or 266-MHz Pentium II system, Digital says that the programs are far slower than native Alpha versions would be. Digital has announced that it will work with Microsoft to embed the translator into Windows NT 5.0.

"Nobody questions that Alpha is a **superior technology,"** says chip analyst Mike Feibus.

Enter Compaq. Two other recent transactions cloud the Alpha line's future. Last fall Digital struck a deal to sell its chip plant to Intel, placing the latter in the odd position of manufacturing its rival's CPUs. Then in January, Digital agreed to be acquired by Compaq, a PC giant that made its name by providing systems with Intel (and occasionally Cyrix or AMD) inside.

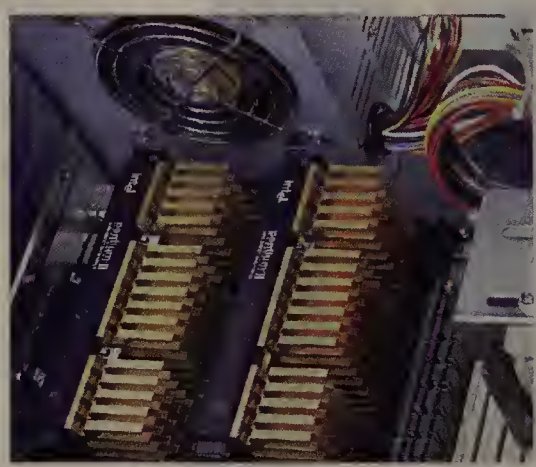
Compaq could sell the Alpha line, spin it off, or scuttle it altogether, says Mercury's Feibus. If Compaq pushes forward, it may lose interest once Intel's Merced arrives. But, says Feibus, "for now, Alpha will be around. Why should Compaq make a decision before it has to?"

—Harry McCracken

desktops in that both have a lot of processing power, a lot of disk space, and a lot of bandwidth in between. But workstations are usually tuned for specific high-end tasks. For example, many come with seriously powerful graphics boards targeted at the 3D imaging that plays a big part in CAD and animation work. Intergraph's TD-225 workstation includes the company's Intense 3D Pro 2200-T graphics card with a whopping 16MB of RAM—completely unnecessary for typical business applications. But when we designed some complex 3D objects using Caligari's TrueSpace3 (see "Workstation Graphics: 3D or Not 3D?"), the Intergraph TD-225 showed its mettle: Among the four workstations we tested, it was the fastest at creating three of five images.

NOT JUST FOR GRAPHICS GURUS

NOT EVERY WORKSTATION is meant for high-powered graphics work. For instance, Dell's $3907 WorkStation 400, with a single Pentium II-300 CPU, targets financial analysts. Though the unit we tested included a graphics adapter with no 3D acceleration and only 4MB of video RAM, the WorkStation 400 does have 128MB of main memory, *two* 17-inch monitors, and the ability to drive both displays at once—perfect for industrial-strength number-crunching in statistical packages and spreadsheets. (Currently shipping units come with 8MB of video RAM.)



Like many workstations, the Intergraph TD-225 sports two Pentium II processors.

Even more than power desktops, workstations usually feature souped-up disk subsystems. For example, HP's Kayak XU, aimed at CAD users, pulls out all the stops by including a pair of 4.5GB Seagate Cheetah drives with a 7.5-millisecond seek time and a spindle speed of 10,000 revolutions per minute—almost twice that of most IDE drives. An UltraWide SCSI bus with a peak transfer rate of 40 MBps, plus a RAID controller with a 16MB cache, let the system read or write to both drives simultaneously. It's just the kind of bandwidth that users who shuttle big CAD drawings in and out of memory can appreciate.

Workstation prices will inevitably fall, and Microsoft's oft-declared goal is to make Windows NT 5.0 its dominant operating system for business users. You may not need an NT workstation today, but there's a good chance you'll eventually have a descendant of one of these high-powered machines on your desk.

Mike Hogan, a regular contributor to PC World, *is based in Carlsbad, California. Harry McCracken is a senior writer for* PC World. *Computer system testing was performed by Robert James.* ■

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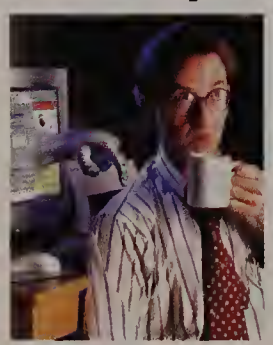

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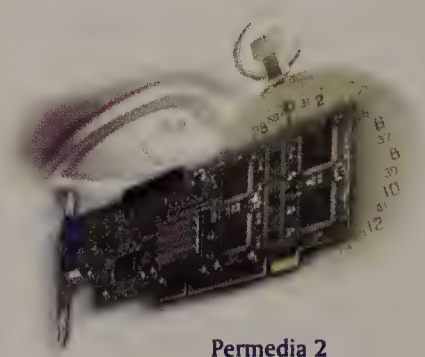

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- 32X Max EIDE CD-ROM Drive
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- K56flex protocol Fax/Modem* w/Voice Mail and Speakerphone
- 32X Max EIDE CD-ROM Drive
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-45 Speakers with subwoofer
- Duantex ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- MS Windows '95 with MS Plus!
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Best Buy Specials

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- Toshiba MPACT2 3D Media Accelerator w/8MB RDRAM
- 19" Digital Monitor (18.1" viewable)
- K56flex protocol Fax/Modem* w/Voice Mail and Speakerphone
- 2nd-Generation DVD-ROM Drive w/MPACT2 Decoding
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-90 Speakers
- Duantex ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows '95 with MS Plus!
- Value Multimedia Software Bundle
- 3-year limited warranty with 1-year On-Site Service**

SM-Series Best Buy (featuring Pentium® II processor) $2199
Lease: $77/Mo.

- 333MHz Pentium® II Processor
- 2 Universal Serial Bus (USB) Ports/ Intel 440LX PCI Chipset
- 64MB SDRAM Memory / 512KB Secondary Cache
- 6.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- Toshiba MPACT2 3D Media Accelerator w/8MB RDRAM
- 19" Digital Monitor (18.1" viewable)
- K56flex protocol Fax/Modem* w/Voice Mail and Speakerphone
- 2nd-Generation DVD-ROM Drive w/MPACT2 Decoding
- Ensoniq 32-Bit Wavetable Sound Card
- Altec-Lansing ACS-45 Speakers with subwoofer
- Duantex ATX Mid Tower Case
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- HP Laserjet 6L Laser Printer.....$ 379
- Microsoft® Sidewinder™ 3D Joystick.....$ 59

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STREETWISE

BY JAMES A. MARTIN

If YOU HAPPEN to find yourself in a conversation with the chief executive officer of a certain software company in Florida, please, whatever you do, *don't* mention my name.

Five years ago, I flew to Tampa to meet the CEO. En route to our appointment, I drove north instead of south for several miles before realizing I was lost. Anxious to get back on track, I hopped onto another freeway—and promptly found myself stuck in traffic. Eventually, I got headed in the right direction, but to no avail: I rushed into the meeting 90 minutes late, only to face an unmistakably irate executive.

Can travel-planning software prevent such a debacle? As I headed out to road test the latest street atlas and trip-planning programs for this article, I recalled the CEO's withering scowl and wondered whether my biggest business travel "whoops" could have been avoided. ▶

Let me guess. You hate to ask for directions. Our road tests found the best street atlases and trip planners.

ILLUSTRATIONS BY ADAM McCAULEY

Gentlemen, Start Your Engines

I STARTED my tire-kicking with three major street atlases: Microsoft's $70 **Expedia Streets 98 Deluxe Edition,** DeLorme's $45 **Street Atlas USA 5.0,** and Rand McNally's $45 **StreetFinder Deluxe 1998 Edition.** Street atlases help you navigate within a city, theoretically letting you pinpoint an address on a detailed street map of any city or town in the United States, find businesses nearby, and get to other locations. Though many also give basic city-to-city directions, their strength lies in the precise details they give for a single place.

Trip planners promise to keep you on course while driving from one major U.S. city or town to another. They offer a turn-by-turn itinerary and maps illustrating the route—plus listings of restaurants, hotels, and attractions on the way. These packages focus on points of interest that enhance a longer trip, rather than on day-to-day details. I tested three trip planners: DeLorme's $40 **AAA Map'n'Go 3.0,** Microsoft's $40 **Expedia Trip Planner 98,** and Rand McNally's $45 **TripMaker Deluxe 1998 Edition.**

Some packages purport to do both in-city and town-to-town routing. I tested one such hybrid, TravRoute Software's $70 **Road Trips Door-to-Door Pro.**

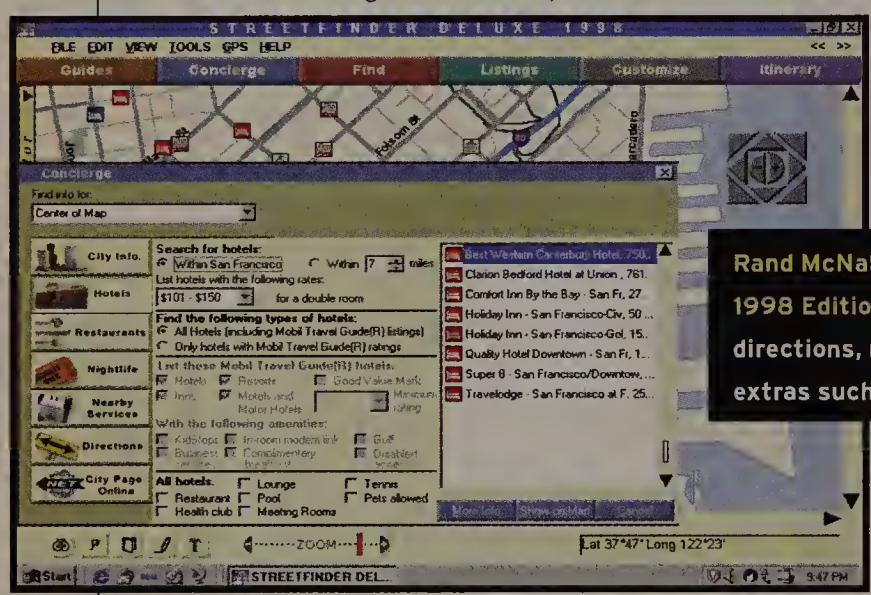
Satellites and Speed Bumps

I USED EACH of the seven packages to plan and take one of two business trips: a local outing from the San Francisco International Airport to a downtown hotel and restaurant to evaluate the street atlases; and an out-of-town jaunt from San Francisco to the Monterey Bay area to test the trip planners. I used Road Trips Door-to-Door Pro on *both* of these trips.

The results of my excursions were mixed.

BEST BUYS

NO TRAVEL software can save you from having to drive to a boring business seminar, but Rand McNally's **StreetFinder Deluxe 1998 Edition** and **TripMaker Deluxe 1998 Edition** can help you avoid some hassle in getting there. StreetFinder is ideal for business travelers who need help navigating unfamiliar cities, while TripMaker is geared toward travelers going from one town to another who want to see some sights along the way. Both sport a similar, newly streamlined interface; and each provides abundant travel-related information and sophisticated, integrated Internet links. In fact, you could easily buy both programs at just $45 each—for short and long trips.



Rand McNally's StreetFinder Deluxe 1998 Edition, a Best Buy, gives great directions, routing options, and extras such as the Concierge (left).

PHOTOGRAPH: KEN SMITH

MAPPING SOFTWARE

		Street price (2/1/98)	Overall value	EASE OF USE: Interface	EASE OF USE: Search engine	EASE OF USE: Map navigation	EASE OF USE: Map annotation	INFORMATION: Routing type	INFORMATION: Routing accuracy	INFORMATION: Geographic detail on maps	INFORMATION: Hotel and restaurant listings [1]
STREET ATLASES	**Expedia Streets 98 Deluxe Edition** Microsoft 800/426-9400 www.microsoft.com Reader service no. 607	$70	fair	excellent	excellent	excellent	very good	routing not offered	routing not offered	fair	good
STREET ATLASES	**Street Atlas USA 5.0** DeLorme 800/452-5931 www.delorme.com Reader service no. 608	$45	fair	fair	good	good	good	door to door, city to city	very good	excellent	fair
STREET ATLASES	**StreetFinder Deluxe 1998 Edition** Rand McNally 800/671-5006 www.randmcnally.com Reader service no. 609	$45	very good	very good	very good	very good	very good	door to door,[4] city to city	very good [5]	fair	good
STREET ATLASES	**Road Trips Door-to-Door Pro [6]** TravRoute Software 888/872-8768 www.travroute.com Reader service no. 610	$70	poor	poor	poor	good	fair	door to door, city to city	poor	very good	poor
TRIP PLANNERS	**AAA Map'n'Go 3.0** DeLorme 800/452-5931 www.delorme.com Reader service no. 611	$40	fair	fair	fair	good	good	city to city	very good	good	very good
TRIP PLANNERS	**Expedia Trip Planner 98** Microsoft 800/426-9400 www.microsoft.com Reader service no. 612	$40	fair	excellent	excellent	excellent	very good	city to city	fair	good	fair
TRIP PLANNERS	**TripMaker Deluxe 1998 Edition** Rand McNally 800/671-5006 www.randmcnally.com Reader service no. 613	$45	very good	very good	good	very good	very good	city to city	very good	very good	good

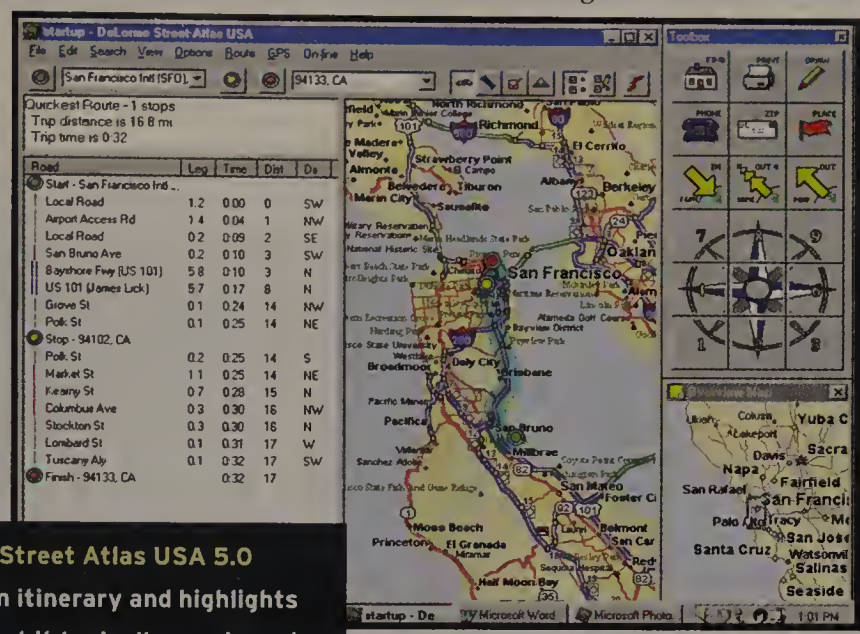
Best Buy — Yes No

For more information about all products in this table, circle reader service no. 901.

[1] Quality and quantity of listings. [2] Numbers provided by vendor. [3] None of the vendors offer toll-free support or weekend hours.

Despite the vendors' promises, I ran across several speed bumps. Door-to-door directions weren't always accurate, and no product gave seasoned travel advice. The trip planner AAA Map'n'Go 3.0, for instance, printed several maps with skewed geography; the vendor considers this quirk a plus.

Expedia Trip Planner and Door-to-Door Pro gave me boneheaded directions. In fact, Expedia gives directions only if you draw the route yourself on a map. But I was impressed by the features offered in my Best Buys, Rand McNally's StreetFinder Deluxe 1998 and its TripMaker Deluxe 1998. Both of these products work well with the company's Web site (www.randmcnally.com) to provide updated info, but you have to dial up.



DeLorme's Street Atlas USA 5.0 maps out an itinerary and highlights the route, but it typically requires zip codes in order to find distinct sites.

GOING FROM A (AIRPORT) TO B (BIX)

TO SEE HOW WELL the street atlases could locate destinations and provide directions, I asked each to guide me from San Francisco International Airport to the Westin St. Francis, a grand old hotel, and from there to Bix, a supper club on an alley surrounded by one-way streets. Since the programs all boast the ability to map millions of businesses, I also tried locating the services I'd seek on a business trip—nearby copy shops, gyms, and banks.

Ideally, a street atlas would let you type in each destination and receive step-by-step directions. You could zoom in on a particular location and identify nearby businesses that meet your criteria, then click to get more information, such as a restaurant review.

Unfortunately, the reality doesn't live up to the ideal. None of the street atlas programs met all these challenges. For example, only Microsoft Expedia Streets 98 Deluxe located the San Francisco Airport, the St. Francis Hotel, and Bix by name, in part because of its extensive listings. But Expedia Streets was also the only program that didn't offer any routing help—a major drawback. Rand McNally's StreetFinder Deluxe located the airport and Bix by name but not the well-known St. Francis. DeLorme's Street Atlas USA 5.0 and TravRoute's Road Trips Door-to-Door Pro were the only programs to show which streets ran one way, yet both had other weaknesses that kept them out of the running. In the end, StreetFinder won out thanks to its combination of excellent routing, strong features, and a low price.

Expedia Streets' Dead End

WITH EXPEDIA STREETS, I easily located all three destinations. Finding locations with StreetFinder was a little harder—its interface wasn't quite as intuitive. ▶

Attraction and entertainment listings [1]	Number of business listings [2]	Accuracy of listings	SUPPORT: Online	SUPPORT: Weekday hours [3]	OTHER: Internet links	OTHER: Print options/ quality	OTHER: Airport diagrams	RAM required (MB)	Disk space (MB)	Comments
good	14 million (Deluxe version only)	very good	●	12	good	excellent/ very good	○	8	34	PRO: Easy-to-use interface, maps, and search tool; restaurant reviews; huge database of business listings. CON: Expensive, one-way streets not identified, no routing available.
fair	2 million	good	●	8.5	fair	good/ very good	○	8	30	PRO: Good door-to-door routing within and between cities, one-way streets displayed. CON: Awkward interface, no hotel or restaurant ratings or details, can't use addresses for interim stops.
good	1 million	very good	●	9	excellent	good/ good	●	8	24	PRO: Door-to-door routing within and between cities, inexpensive, wealth of travel information, good airport maps. CON: One-way streets not displayed.
poor	15 million	fair	●	8	poor	fair/ poor	○	16	90	PRO: Door-to-door routing within and between cities, largest number of business listings. CON: Expensive, inaccurate directions, awkward interface, poor print quality, PC resource intensive.
very good	64,000	good	●	8.5	fair	good/ poor	○	8	9	PRO: Good travel listings and details, very good written directions, inexpensive. CON: Awkward interface, can't mix routing preferences, some maps printed with geography upside down.
good	49,000	very good	●	12	good	excellent/ very good	○	8	30	PRO: Easy-to-use interface, maps, and search tool; good multimedia; good print quality and options. CON: Poor routing, quality of listings not as strong as in AAA Map'n'Go or TripMaker.
good	31,700	very good	●	9	excellent	good/ good	●	8	24	PRO: Accurate routing, superbly integrated Internet updates, fast and highly flexible route calculation, cool music and video clips. CON: Listing content could be stronger.

HOW WE TEST Street atlases tested on a single trip within the San Francisco Bay Area. Trip planners tested on a single round-trip excursion between San Francisco and Pacific Grove, California.

[1] Via Internet connection. [2] Written directions must be accessed from the Web. [3] Tested as both a street atlas and a trip planner.

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Street Atlas USA and Door-to-Door Pro found the airport by name, but I had to use street addresses and zip codes for the other two spots—a little excessive, I thought.

Expedia Streets has other fine features, but it also has some problems. Its browserlike interface with back and forward buttons is the most intuitive in its class, and map navigation is refreshingly easy. I liked being able to download maps to my Windows CE handheld PC. But when it comes to devising a route, Expedia Streets is a dead end. Though I outlined my path with the program's route drawing tool, I had to figure out the route myself. The program doesn't identify one-way streets, either, so I had to call for directions. Why bother with a mapping program?

Roadblocks Rare With Rand McNally

RAND MCNALLY'S StreetFinder produced the most direct and sensible door-to-door itinerary, including accurate travel distances for each segment. Three caveats, however: First, to get those directions, you need an active Internet connection, which could be a problem if you're on the road. Second, you can't specify interim stops unless you break your trip into segments. Third, the program doesn't highlight your route on a map; you have to make do with written directions.

Street Atlas USA and Door-to-Door Pro gave me detailed written directions to all three destinations—but not without some roadblocks. Street Atlas USA, for instance, got me to the right street but not to the exact address of my interim stop. Door-to- ▶

DRIVE LOCALLY, THINK GLOBALLY

IT'S LATE AT NIGHT, it's raining, and you are lost. You could try a lonely motel for the night, but that's what Janet Leigh did in *Psycho*, and look what happened to her. A better idea: look up into the sky and ask the Department of Defense for help.

The DOD created the Global Positioning System, satellites that beam signals to GPS receivers, which let the receiver determine its position, altitude, speed, and direction of travel. I attached a GPS receiver to a notebook and rented a GPS-equipped car, and was pleasantly surprised.

➤ **Notebook GPS systems.** I used two notebook GPS devices: Etak's SkyMap Pro and DeLorme's Tripmate. Etak delivered better signals, but it did not provide step-by-step audio directions. DeLorme did supply voice directions, but it couldn't always find or hold a signal.

SkyMap's GPS receiver includes a PC Card and an antenna. Its software traces your path on-screen, while a voice prompt gives your position. Even in a storm, it never dropped a signal.

By contrast, DeLorme's Tripmate receiver, an ugly yellow device cabled to your PC, couldn't find a signal during a storm. Combined with Street Atlas USA 5.0, however, Tripmate offers detailed voice navigation.

All of the software I tested can take a GPS receiver, preferably a separate, high-end model that's better at finding signals.

➤ **GPS-equipped rental cars.** Available at 50 spots in 35 U.S. cities, the Hertz NeverLost GPS system adds $6 a day to the rental cost of all car classes. Given its dead-on tracking and ease of use, that's money well spent.

Using an LCD screen embedded in an adjustable arm, and a free-standing, display-based keypad, I selected a destination and calculated a route (you can choose shortest-time or maximum/minimum freeway routes). I could view directions or a real-time position map.

NeverLost always kept up with me. Curvy roads and intersections appeared on the map. Best of all, the digitized male voice prompts were always on target. It was almost scary.

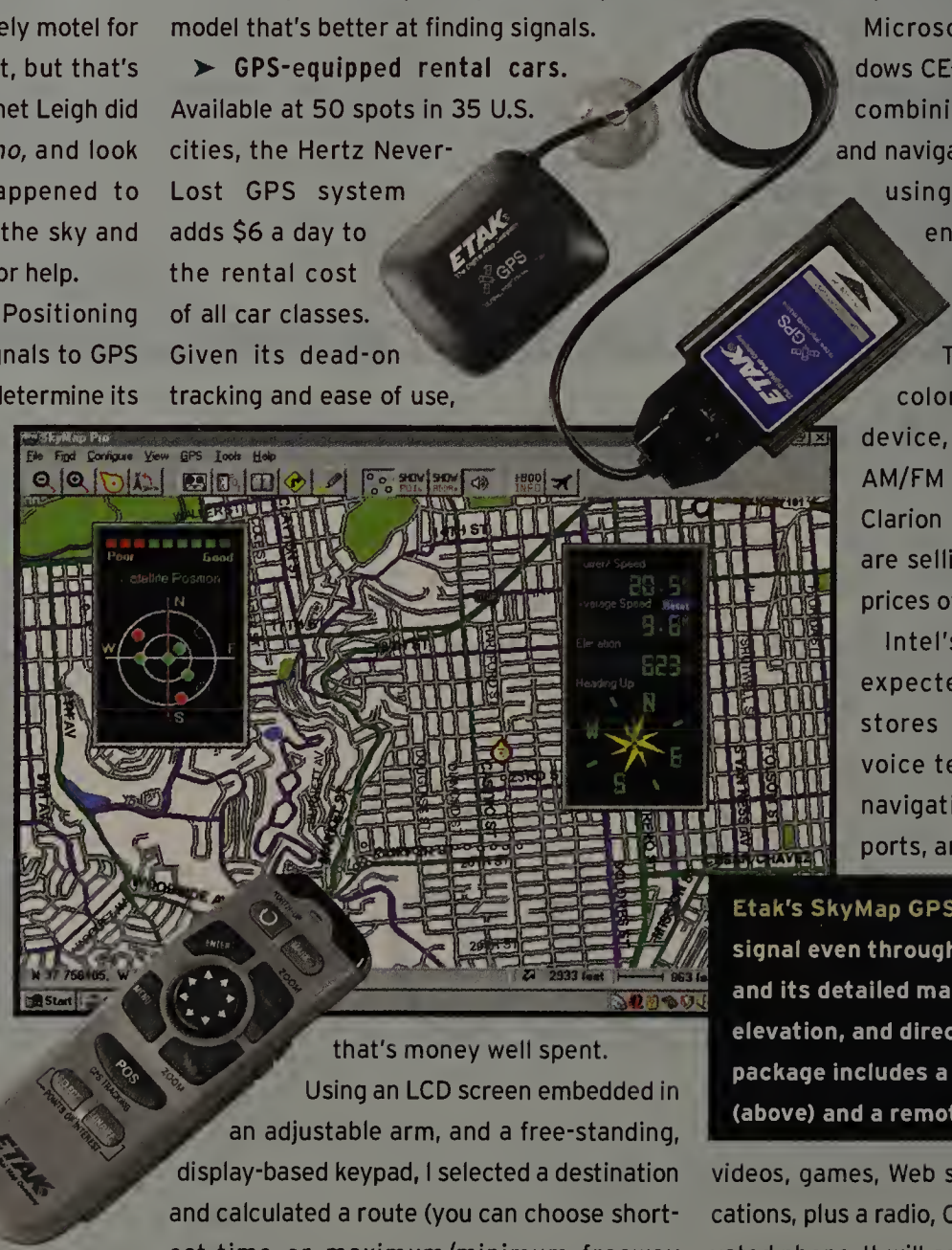
➤ **An in-car GPS of your own.** The driving future is here, and it's voice-activated. Several major computer companies plan to offer in-car navigation systems this year.

Microsoft's Auto PC is a Windows CE-based software system combining speech recognition and navigation. It gives directions using voice prompts and enables drivers to send and receive e-mail and listen to traffic alerts. The system includes a color LCD screen, an input device, a CD player, and an AM/FM radio. Alpine Japan and Clarion Corporation of America are selling Auto PCs for street prices of $1000 to $1300.

Intel's Connected Car PC, expected to be available in stores in 1999, will also use voice technology to transmit navigational advice, traffic reports, and e-mail, but it will add videos, games, Web surfing, and a few applications, plus a radio, CD player, and voice-activated phone. It will cost $1000 to $2500.

SkyMap Pro $300 street; Etak; 800/765-0555; www.etak.com. Reader service no. 601

Tripmate $150 street; DeLorme; 800/227-1656; www.delorme.com. Reader service no. 602



Etak's SkyMap GPS system holds a signal even through treacherous terrain, and its detailed map highlights speed, elevation, and direction. The $300 package includes a receiver and PC card (above) and a remote control (left).

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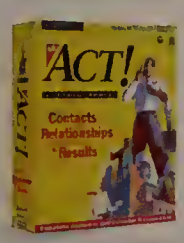

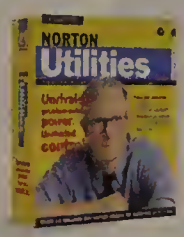

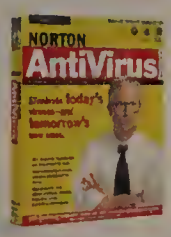

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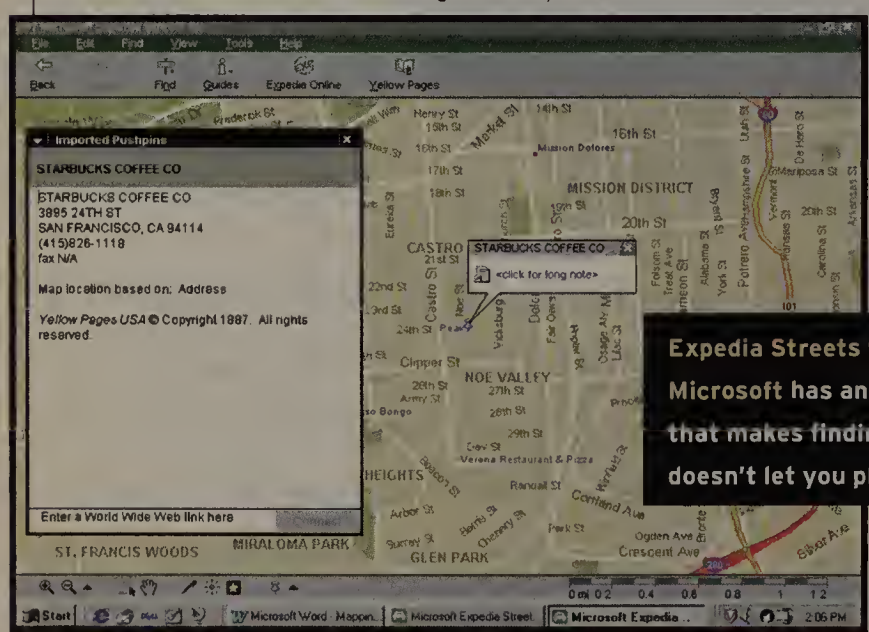
Circle 232 on reader service card

Door Pro let me use street addresses, but told me to head west on Market Street and turn left, despite a no-left-turn sign.

When it came to finding businesses near my hotel, my two favorite street atlases—Expedia Streets and StreetFinder—stood out like red convertibles. Expedia Streets located 1096 restaurants within a mile of my hotel, many of its listings accompanied by reviews from the Zagat guides. StreetFinder was a close second: Its Concierge tool makes it easy to search for restaurants, local culture, and nearby businesses. It found almost as many restaurants as Expedia within the same radius (934), though most were unreviewed. With Door-to-Door Pro and Street Atlas USA, you're stuck in your room: They offer little beyond an unannotated selection of names on the map.

Deciding between Expedia Street and StreetFinder as our top street atlas was tough: Both are loaded with information that business travelers need. Both are easy to use, and both print the most legible maps with little wasted paper. Still, StreetFinder Deluxe is the atlas to get. It offers route-planning help, while Expedia doesn't—a major consideration. Neither program identifies one-way streets, but StreetFinder partially overcomes this deficiency by offering door-to-door directions via the Internet. Unlike Expedia Streets, StreetFinder also includes maps of major U.S. airport so you can avoid terminal panic. Finally, StreetFinder costs $25 less.

Make sure you get the deluxe version of StreetFinder (reviewed here). It adds the Concierge tool, *Mobil Travel Guide* restaurant and lodging ratings, and GPS support, which are worth the extra 20 bucks.

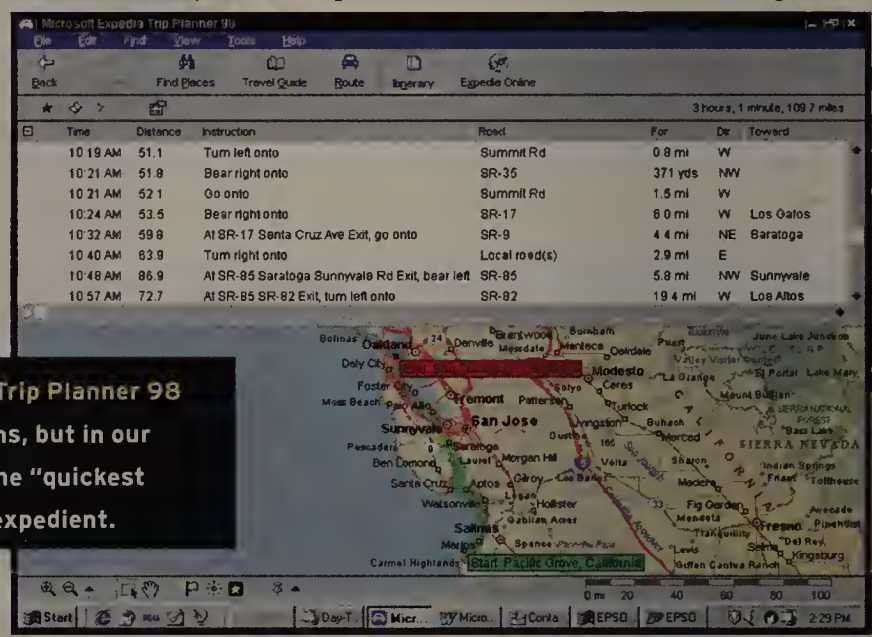


Expedia Streets 98 Deluxe from Microsoft has an intuitive interface that makes finding details easy, but it doesn't let you plan interim stops.

MIXING BUSINESS WITH PLEASURE

TO TEST the trip planners, I set off for an overnight stay in the Monterey Bay area, south of San Francisco. Because the town of Monterey is known for its magnificent aquarium, historic Cannery Row, and spectacular coastal setting, it's often crowded with tourists. And that is why on this trip I wanted to stay in neighboring Pacific Grove, a quieter community.

Often overlooked by tourists, Pacific Grove is a misty seaside town filled with colorful Victorian homes; a beautiful lighthouse surrounded by one of Clint Eastwood's favorite golf courses; and a small patch of woods that serves as the winter home to fluttering clusters of monarch butterflies.



Microsoft's Expedia Trip Planner 98 offers exact directions, but in our tests its version of the "quickest route" was far from expedient.

I researched Pacific Grove hotels, restaurants, and attractions, as well as restaurants in Capitola, a charming town en route. I requested the fastest path from my home in San Francisco to Capitola, and the most scenic way from Capitola to Pacific Grove. For my return, I calculated the quickest course from Pacific Grove to San Francisco, then printed the maps and directions. The result: Again, no one trip planner could handle all the chores; Rand McNally's TripMaker Deluxe 1998 Edition came closest.

Pacific Grove Proves Elusive

RIGHT OFF THE BAT, digging up an offbeat inn in Pacific Grove proved too much for these trip planners. Only Microsoft Expedia Trip Planner 98 came up with anything of interest. As a result, I consulted a book and chose the Seven Gables Inn—a romantic Victorian with a view of the shore—reserving my room by phone.

Researching restaurants by keyboard was a bit more fruitful. Rand McNally's TripMaker and DeLorme's AAA Map'n' Go 3.0 gave me three enticing listings to choose from, with ratings and more information. In contrast, Expedia Trip Planner came up with just two restaurants, both accompanied by reviews, and TravRoute's Road Trips Door-to-Door Pro could offer only a Web link, from which I downloaded a list of eateries—primarily fast-food joints. None could locate a restaurant in Capitola.

As for attractions, only Door-to-Door Pro found the Point Piños Lighthouse by name, though all four programs showed it on area maps. Details were elusive until I read AAA Map'n'Go's text overview of Pacific Grove, which gave locations for the lighthouse and the monarch habitat.

Door-to-Door Potholes

THE BIGGEST DIFFERENCES between the four programs arose when I planned the drive. The most bewildering directions came from Door-to-Door Pro. Initially, the going appeared smooth. The program spit out a detailed itinerary, telling me when to turn and warning when a road changed name. But once I got into my car, the potholes became clear. For the drive from my house to Interstate Highway 280, Door-to-Door Pro instructed me to zigzag through one obscure street after another—when all I really had to do was drive down one major street to the highway. Later, the pro- ▶

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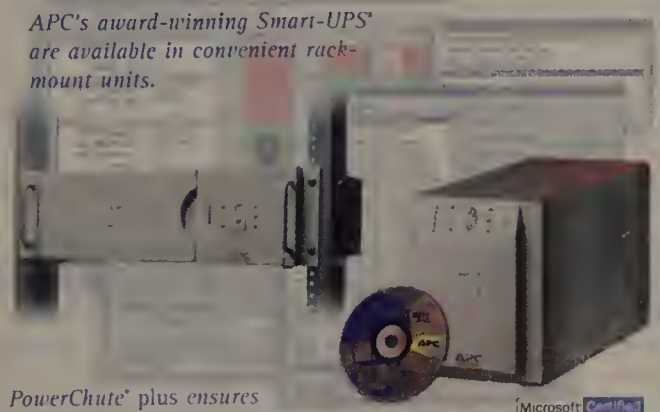

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gram directed me to take three highways in succession, when I knew a cleaner route.

In fact, Door-to-Door Pro gave me problems from the start. It couldn't even find my home, which lies on a major street. Though no program can be expected to know all the ins and outs of local routes, I had hoped for better.

Door-to-Door Pro was frustrating in other ways, too. For example, instead of supplying a scenic-route option, it offers three pedestrian selections: the quickest route, which uses freeways as much as possible; the shortest, which covers the fewest miles (often over inefficient back roads); and custom routing, the most useful (and most complicated) method. Custom routing lets you set preferences and filter out such costly options as toll roads and ferries. Unfortunately, Door-to-Door Pro doesn't let you use different routing preferences for different trip segments. As a result, I had to create two separate itineraries.

THE WHOLE WORLD IN YOUR HANDS

THE PSION Series 5, a powerful handheld computer, puts the world in your palm—well, almost. Palmtop B.V., a Netherlands-based Psion developer, offers a program called En Route in versions for North America and Europe. En Route gives turn-by-turn directions and calculates quickest, shortest, and preferred routes—though it lacks the travel information (such as hotels) you'd find in a desktop trip planner. You can view a map, written directions, or both simultaneously, but the last option makes for a cramped view on the Series 5's touch screen with 640 by 240 resolution. A better bet is to switch between views. (A similar setup, which I did not test, is available from DeLorme's Street Atlas USA; it can port directions to a 3Com PalmPilot.)

The directions I got were good, though I would not recommend reading them while driving. You can also pinpoint your location on a map using a PC Card Modem Adapter and a GPS device with NMEA output such as the receiver that comes with Etak's SkyMap Pro (NMEA is a GPS standard). Not bad for a computer the size of a checkbook.

En Route Europe $79 list (varies by conversion rate); Palmtop B.V.; www.palmtop.nl. Reader service no. 603

En Route North America $79 list, available through Psion; 800/997-7466; www.psion.com. Reader service no. 604

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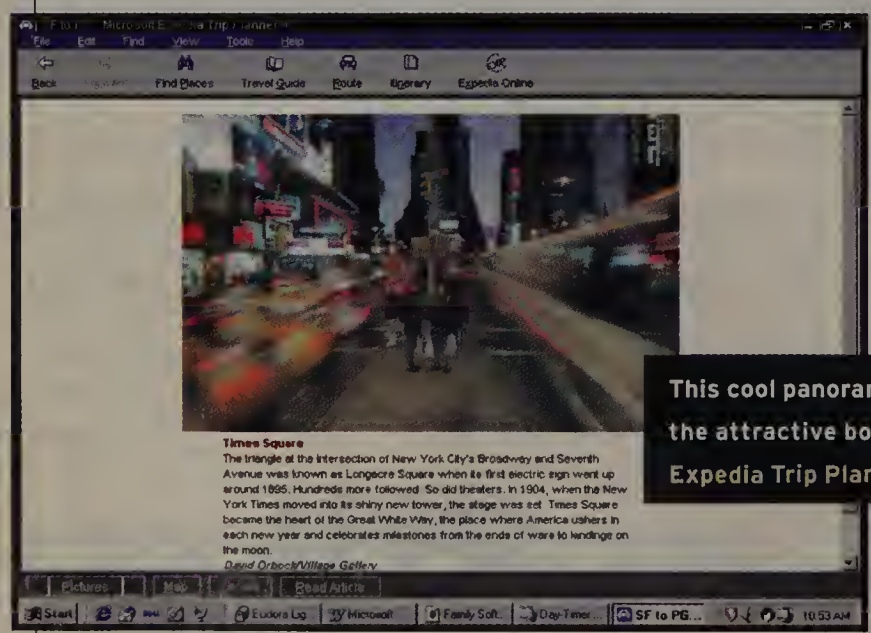
The Psion Series 5 is handy for En Route's maps and routing.

Expedia's Ups and Downs

EXPEDIA Trip Planner 98 threw me a few big curves, too. Like Expedia Streets, it has the most convenient interface. It also includes links to the similarly designed Microsoft Expedia Web site; a gallery of evocative panoramic photos and regional music clips; and the most flexible print options (for instance, you can print each stop on a new page).



This cool panoramic image is one of the attractive bonuses of Microsoft's Expedia Trip Planner 98.

Unfortunately, the travel information seems spotty, and the program offers no scenic routing. Most disturbing was Trip Planner's "quickest route" to Pacific Grove, which pointed me to one of the San Francisco Bay Area's most notorious traffic bottlenecks. Perhaps Microsoft has a particularly large billboard there.

In contrast to Trip Planner and Door-to-Door Pro, DeLorme's AAA Map'n'Go generated a sensible, detailed written itinerary. I liked its AAA guidebook data, too, although the info resides awkwardly in self-contained mini-programs. Still, I see room for improvement. AAA Map'n'Go's interface is trickier than it has to be; for example, the on-screen map navigation tools are squirreled away in a hard-to-find toolbox. As with Door-to-Door Pro, I couldn't mix routing preferences for different trip segments. Most perplexing, nearly half of my printed maps placed Pacific Grove *north* of San Francisco—which not even another earthquake could accomplish. A spokesperson from DeLorme says that many people prefer to read maps this way. If, like me, you have a special fondness for geographically correct maps, you must dig deep into the Print dialog box.

Happy Trails With TripMaker

IN THE FINAL reckoning, only Rand McNally's TripMaker was left standing. But TripMaker isn't a Best Buy simply by default. It provides the most flexibility when charting a course, written directions are accurate and detailed, and it offers some cool multimedia, plus maps of state parks and airports. In addition, its current interface greatly improves on the last version, which suffered from icon overkill and an annoying wizard in aviator goggles.

But as with StreetFinder, one of TripMaker's most impressive features is its integrated link to the company's Web site. For instance, using the Online Updates feature, TripMaker grabbed the latest roadwork data off the Net and devised a new, construction-free path. When I drove the original route, I wasn't surprised to encounter those all-too-familiar orange safety cones along that very stretch of highway. (The updating and automatic rerouting feature is available only in ▶

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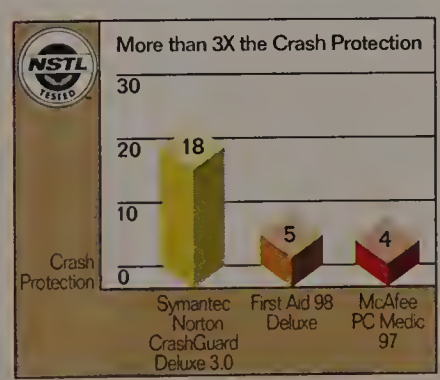

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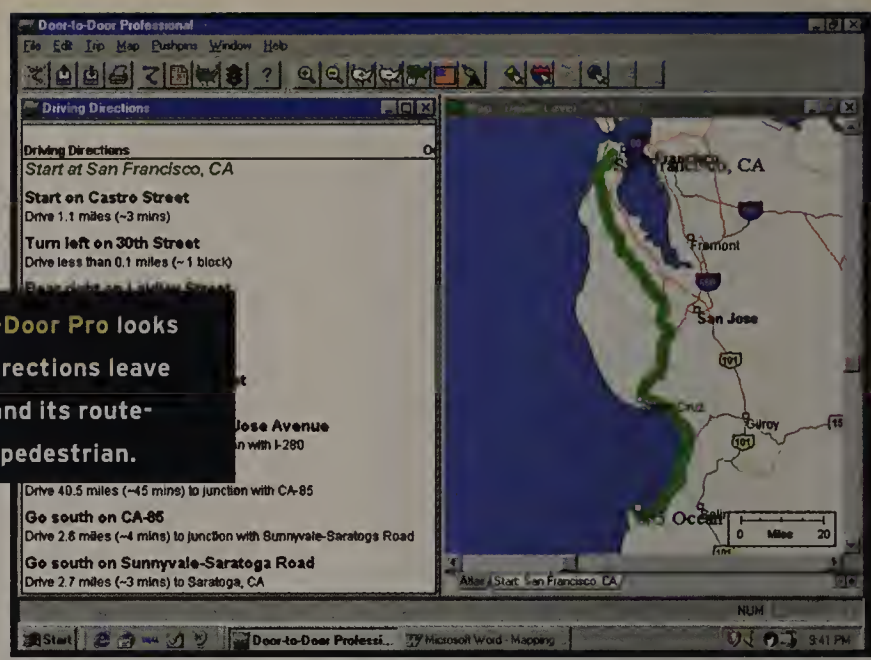
TripMaker Deluxe, but for frequent travelers it's well worth the additional $20 this version costs.)

As good as it is, TripMaker—like all trip-planning programs—still lacks some important features. I'd love to have been warned that Highway 17 is a winding road prone to congestion, for instance. I'd also appreciate an itinerary that warned me of speed changes and heavy traffic periods. As for the big question I had in mind when I started my tests—can a software program prevent a travel debacle?—I'd say the answer is a definite maybe. Programs like TripMaker and StreetFinder can certainly provide enough information and routing possibilities to take some of the guesswork out of planning a trip. But to make a car trip truly whoops-free, I'd need a program that constantly scanned the Internet for traffic congestion along my intended route, alerted me to any impending crunches, and suggested alternate routes to take—all from a remote-controlled computer in my car, so I could keep both hands on the wheel and both eyes on the road. Granted, that's asking a lot, but some companies are heading in that direction already (see the sidebar "Drive Locally, Think Globally"). And who knows? The CEO of a software firm in Florida might be working on such a product already.



TravRoute's Door-to-Door Pro looks impressive, but its directions leave much to be desired, and its route-planning options are pedestrian.

James A. Martin is a contributing editor for PC World *and a frequent contributor to travel magazines.* ■

GOING WORLDWIDE ON THE WEB

WHY SHOULD YOU SPEND a dime on a trip-planning program when you can get free maps on the Internet? Good question. To find out how good the online offerings are, I visited eight Web sites. The bottom line: If you just need occasional directions, you can get them online. Frequent business travelers should invest in a CD-ROM-based street atlas or trip planner. These programs are faster; their travel information is better integrated (you don't have to go to a new page for more facts); and you won't have to rely entirely on an Internet connection while traveling.

Here's a brief guide to the major map sites, each followed by a score rating the usefulness and quality of the maps.

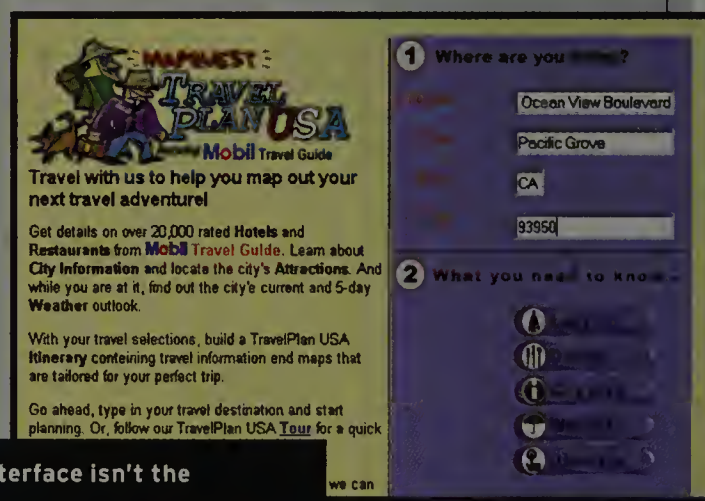
➤ **MapBlast.** Its route planning is fairly basic—no interim stops or door-to-door directions. But if you're looking for an easy way to create a map to your office or home, this is the place to go. www.mapblast.com. Good.

➤ **MapQuest.** The door-to-door directions from San Francisco to Pacific Grove were detailed and accurate—much better, in fact, than the cockamamie course TravRoute Software's $70 Road Trips Door-to-Door Pro led me through. You can print just the directions, an overview map with text, or turn-by-turn maps with text. A related site, TravelQuest, provides hotel and restaurant ratings, though you'll be inundated by flashing ads. The site also has a useful trip-planning resource section. www.mapquest.com. Very good.

➤ **Maps On Us.** Offering interim stops, door-to-door directions, and four routing choices—fastest, shortest, and greatest or least use of freeways—Maps On Us has more features than any other mapping site I've seen. The Plan Best Tour feature arranges the order of your interim stops for maximum efficiency, and the site supplies a Yellow Pages business search tool as well. If you sign on as a member, you can even set routing and other preferences for future trip planning. The maps can be slow to draw, but they come with many useful viewing tools. www.mapsonus.com. Excellent.

➤ **Microsoft Expedia.com.** An all-encompassing travel-planning and travel resource site, Expedia.com has the same easy-to-use interface as the Streets 98 and Trip Planner 98 CD-ROMs. Unfortunately, it also has the same mapping engine, which gave me some downright dumb driving directions. www.expedia.com. Fair.

➤ **Travelocity, Internet Travel Network, Yahoo Maps.** These sites share the same mapping software engine, and the itineraries often look the same. The first two are travel supersites where you can make airline, hotel, and other reservations, and choose short, easy, or fast routes. The short routes were mostly illogical, but the easy and fast routes—often identical—were right on the mark. The accompanying maps don't offer much detail, though. In contrast, Yahoo's map service primarily gives driving directions. www.travelocity.com; www.itn.com; maps.yahoo.com/yahoo/. Good.



Though its interface isn't the prettiest we've seen, the MapQuest Web site offers an outstanding range of options, including door-to-door directions, hotel and restaurant ratings, and trip planning.

➤ **Zip2 Yellow Pages.** While it does offer serviceable driving directions, this site works best as a search tool for locating businesses near your home, hotel, or other address. www.zip2.com. Good.

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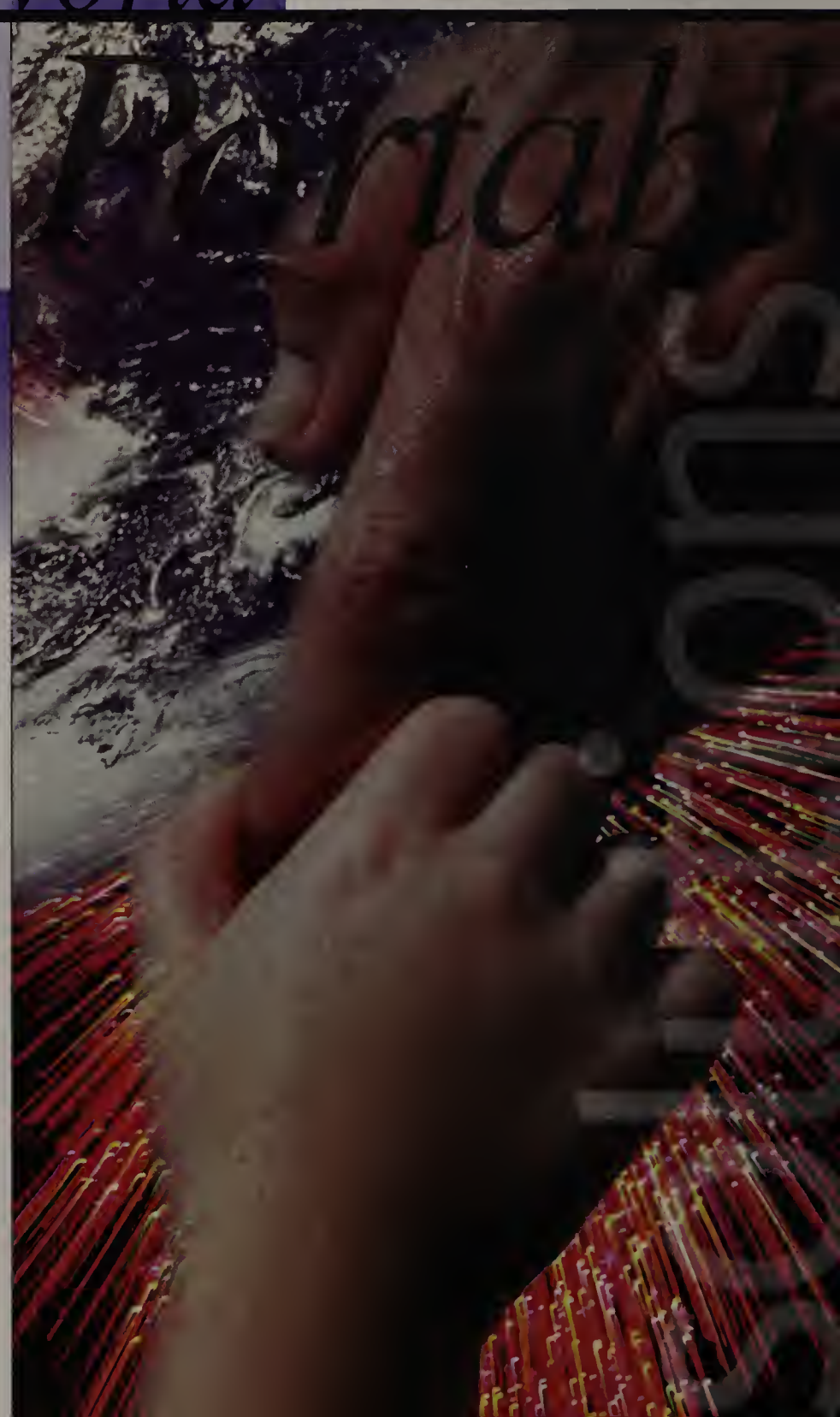

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2 modular expansion bays
2 infrared ports, S-Video, NTSC, game, USB ports
20X CD-ROM drive with AutoPlay technology
128-bit, 2MB DRAM graphics
CardBus and Zoomed Video
16-bit stereo sound and microphone
56Kbps fax/modem*
Pick-a-Point dual pointing devices
Custom nylon carrying case
Microsoft Windows 95 and MS Plus!
Choice of a Micron Portable Software Solutions Pak
Microsoft Office 97 Small Business Edition
Dragon NaturallySpeaking Personal voice recognition software
5-year/1-year Micron limited warranty

$3,199
Bus. lease **$109/mo.**

TransPort VLX

166MHz Intel Pentium processor with MMX technology
40MB EDO RAM
2.1GB hard drive
12.1 TFT SVGA, 800 x 600 display
56Kbps fax/modem
Microsoft Office Small Business Edition

256KB L2 pipeline burst cache
128-bit graphics accelerator
MPEG compatible
Zoomed Video ready
Microphone and 16-bit stereo sound
20X modular CD-ROM drive
2-way infrared port
Modular floppy drive
Li-Ion battery
Microsoft Windows 95 and MS Plus!
Choice of a Micron Portable Software Solutions Pak
5-year/1-year Micron limited warranty

$1,899
Bus. lease **$66/mo.**

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NetFRAME® LV2001

Intel 233MHz Pentium II processor
32MB ECC SDRAM
4GB Ultra Wide SCSI-3 hard drive
NOS support
(1 first-year incident resolution), 7x24

512KB integrated cache in SEC package
ECC SDRAM option (4 DIMM slots)
5 expansion slots: 4PCI, 1 ISA
Integrated Adaptec PCI Ultra Wide SCSI-3 controller
Intel EtherExpress™ Pro 100 network adapter
20X SCSI-2 CD-ROM drive
Upgradable to 36GB storage
Intel LANDesk® Server Manager 2.8
5-year/3-year Micron Power limited warranty
1-year next-business-day on-site service†

$2,399
Bus. lease **$84/mo.**

NetFRAME MV5001

Intel 233MHz Pentium II processor
64MB ECC SDRAM
4GB Ultra Wide SCSI-3 hard drive
NOS support
(1 first-year incident resolution), 7x24

512KB integrated cache in SEC package
9 expansion slots: 6 PCI, 2 ISA, 1 shared ISA/PCI
Dual integrated Symbios Ultra Wide SCSI-3 controller
Integrated Symbios narrow SCSI controller
Intel EtherExpress Pro 100 network adapter
20X SCSI-2 CD-ROM drive
I_2O-ready via embedded Intel i960-RD
5 internal, hot-pluggable, hard drive array bays (upgradable to 10)
1 360-watt hot-pluggable power supply standard (upgradable to 3 for added redundancy)
Intel LANDesk Server Manager 2.8
5-year/3-year Micron Power℠ limited warranty
1-year next-business-day on-site service†

$3,799
Bus. lease **$121/mo.**

ClientPro® 166 Base

Intel 166MHz Pentium processor with MMX technology

Microsoft Windows NT Workstation 4.0
5-year/3-year Micron Power limited warranty

Monitor not included

Starting at
$999

ClientPro 233

Intel 233MHz Pentium processor with MMX technology
32MB SDRAM
3.2GB SMART Ultra ATA hard drive
15" Micron 500Lx, .28dp color monitor (13.7" display)

512KB pipeline burst cache, DMI 2.0 compliant, 2MB flash BIOS
24X variable speed ATAPI CD-ROM drive
2MB EDO DRAM graphics accelerator
Network adapter with 3Com Remote Wake-up™ capability
Microsoft Windows NT Workstation 4.0
5-year/3-year Micron Power limited warranty

$1,499
Bus. lease **$53/mo.**

ClientPro 266

Intel 266MHz Pentium II processor (features MMX technology)
64MB SDRAM
3.2GB SMART Ultra ATA hard drive
17" Micron 700FGx, .26dp (16" display)

512KB internal L2 secondary cache, DMI 2.0 compliant, 2MB flash BIOS
24X variable speed ATAPI CD-ROM drive
4MB AGP 3D video
Network adapter with 3Com Remote Wake-up capability
Microsoft Windows NT Workstation 4.0
5-year/3-year Micron Power limited warranty

$2,049
Bus. lease **$72/mo.**

†On-site service for NetFRAME LV2001 and MV5001 servers is provided by Digital Equipment Corporation and is optional.

MICRON POWER℠ WARRANTY

5-year limited warranty on microprocessor and main memory
3 year limited parts-only system warranty (1-year for TransPort systems)
1- 2- or 3-year optional on-site service agreement for Micron desktop and server systems
30 days of free Micron-supplied software support for Micron desktop systems, 3 optional network operating system incident resolutions included for Micron server systems
30-day money back policy
24 hour technical support

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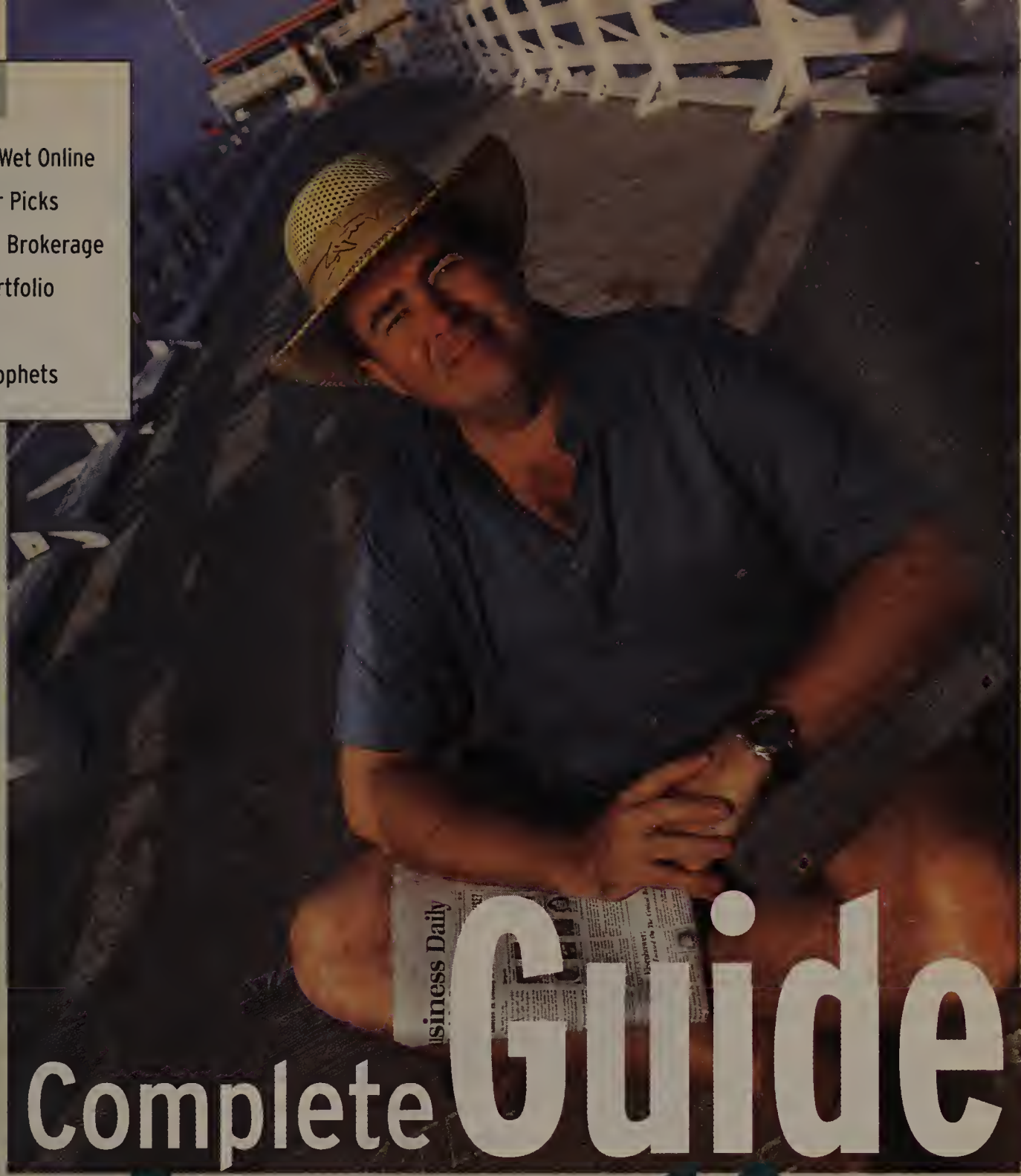


The Complete Guide To Investing With Your PC

BY DOUGLAS GERLACH

FLORIDA'S ANNA Maria Island is a far cry from Wall Street. Hardly a building rises above the tops of the isle's palmetto trees, and the loudest sound comes from the waves lapping at white-sand beaches.

Yet here, just a block from the water, Jim DePorre is as busy as any trader in Manhattan. For the last five years, this onetime certified ▶

PHOTOGRAPH: MICHAEL PRICE

public accountant and attorney has turned his attention to the financial markets and made himself millions of dollars buying and selling stocks. DePorre places dozens of trades each day from his second-floor office on the island—all using his computer.

You can, too. Sound heavenly? Even if your personal fortune is much more modest than DePorre's, the tools to make it grow are within your reach. Anyone with a PC and an Internet connection can plug into a trove of resources. You can get your hands on the same data the experts use to play the market, save a bundle on fees by buying and selling stocks directly online, and wield a host of Web-based tools to manage your burgeoning wealth. The best part: It's almost all free.

Whether you've never bought stock in your life or you know what it means to sell short, lots of helpful sites can guide you down the road to financial security. To help you, we've broken online investing into six steps, from getting your feet wet to choosing an online broker to avoiding cyberswindlers. And check out the Tipper Tape below for sage investment advice.

Of course, no one can guarantee you'll make money investing online. But with all the tools awaiting you on the Internet, you have a fighting chance of retiring in the tropics.

THE FOOL'S SCHOOL is a smart place to learn how to trade stocks—from a 13-step investing guide to an explanation of balance sheets.

Get Your Feet Wet Online

WHAT? YOU say you've never invested before? Or maybe you have but feel you don't know enough to go it alone online. No problem. Internet resources can teach you all the basics of investing in stocks or mutual funds. If you're an America Online subscriber, start at the Investing Basics area (keyword: **investing basics**). It provides lots of information, from key concepts to tips for long-term success. Chat rooms and message boards allow you to share thoughts with other beginners, but beware of what you read in these areas: Scam artists are as thick as flies on an unscreened porch (see "Avoid Investment Scams").

Many investors start a portfolio by buying mutual funds. At the Web site of The Vanguard Group (www.vanguard.com), you can "attend" classes at Vanguard University and complete a ten-course curriculum on the fundamentals of mutual fund investing and retirement planning. Starting with "What Is a Mutual Fund?" the lessons teach you to build a balanced portfolio, covering tax issues, index funds, and guidelines for selecting a mutual fund. And because every university needs a library, Vanguard posts an additional series of articles and commentary.

If you're ready to plunge directly into stocks, The Motley Fool at www.fool.com (or AOL keyword: **fool**) provides an excellent background. The Motley Fool's premise is that the "wise people" of Wall Street—the investment pros—aren't always so smart, and that individual investors can outperform the pundits by using a little common sense.

The Fool's School lays out 13 steps to investing, starting with buying *index funds*, which attempt to mirror the performance of the market as a whole. As your learning progresses, The Fool introduces you to different investment styles, such as the "Dow Dividend" method, which requires spending just an hour each year buying the ten stocks in the Dow Jones Industrial Average that pay the highest dividend yield. The beauty of such methods lies in their simplicity.

Before you leap. Read enough about investing but unprepared to lay down the cash? Why not practice with a mock portfolio? Make a few picks and see how well they do. Check on them in newspapers, or use one of the online tracking tools noted in Step 4. Another option is to join a market simulation game like Final Bell (www.finalbell.com). Players set up a portfolio with play money, and then "buy" and "sell" shares for the duration of the contest. Winners—those who end up with the most money—even receive real cash prizes. It's easy to sign up, too: Just register at the site. Participation is free.

Research Your Picks

ONCE YOU have a handle on how to invest, it's time to figure out where to put your money. With thousands of financial Web sites at your disposal, the search for information about stocks and

THE TIPPER TAPE *Define your goals before you start investing.* ····· *Max out your 401(k*

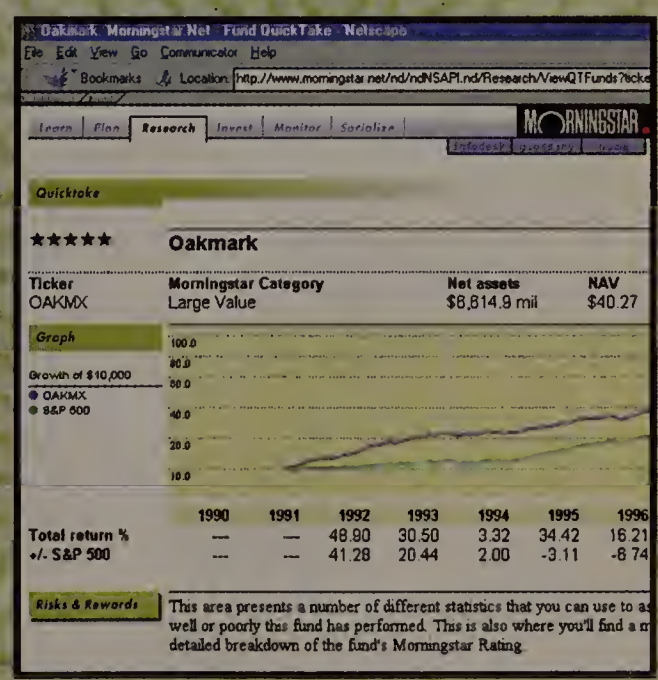
ONLINE INVESTMENT RESOURCES AT A GLANCE

Research	URL	Comments
DailyStocks	www.dailystocks.com	Plenty of pointers to company research on the Web.
FreeEDGAR	www.freeedgar.com	Real-time access to SEC filings made by companies.
InvesTools	www.investools.com	Newsletters, news, and research reports—some for a fee.
Morningstar	www.morningstar.net	Extensive stock and fund research, plus star ratings of mutual funds.
SEC EDGAR	www.sec.gov/edgarhp.htm	Database of corporate filings made by public companies.
Thomson Real-Time Quotes	www.thomsonrtq.com	Access to free real-time stock quotes, plus other resources.
Wall Street Research Net	www.wsrn.com	Lots of links for stock research; fundamental data, too.
Trading Information		
OnlineInvestors.com	www.onlineinvestors.com	Ratings of discount brokerages—important for finding the right broker.
Gomez Advisors	www.gomezadvisors.com	Research firm ratings and ranking online brokers.
Portfolio Tracking		
Yahoo Finance	quote.yahoo.com	Quick and easy portfolio tracking, plus lots of news, information, and links.
InfoBeat	www.infobeat.com	Free e-mail service that tracks your portfolio.
Investment Clubs		
NAIC	www.better-investing.org	Offers help on starting your own investment club.
Club Web Pages	www.investorama.com/olclubs.shtml	Directory of investment club Web pages.
Stock Talk		
The Silicon Investor	www.techstocks.com	Lots of talk about technology stocks and other industry stocks.
The Motley Fool	www.fool.com	Message boards let investors meet head-to-head and get advice.

mutual funds can be daunting. Fortunately, we know a couple of good places for you to start looking. Both DailyStocks (www.dailystocks.com) and Wall Street Research Net (www.wsrn.com) are free virtual gateways to all sorts of financial resources, including research, government data, and brokerage sites. The two sites also offer fundamental data of their own—historical financial statements, earnings estimates, and so forth—but the emphasis is on cutting through the nonessentials and providing a springboard to the important information you need on the Web.

A super source. After sampling what's available, visit Yahoo Finance (quote.yahoo.com), which provides comprehensive, free information about stocks and mutual funds. Type a stock ticker symbol, and you'll get a price chart for various time periods, plus news stories, a brief company profile, analysts' earnings estimates, and the company's quarterly and annual filings with the Securities and Exchange Commission. Yahoo Finance's mutual fund reports include an overview of each fund, plus performance statistics and a summary of its holdings. The selection of information, while not especially broad, is extensive enough to be valuable for most investors no matter what their skill level. The site's simple design and fast response make it one of the easiest to use on the Web.

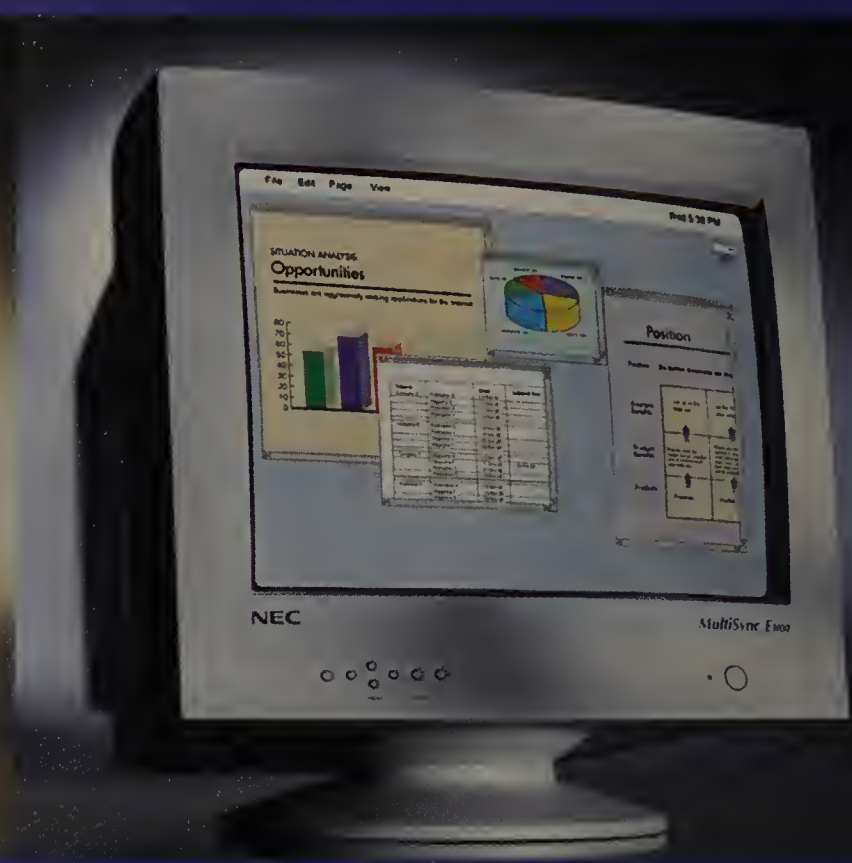
If you want to dig deeper, check out Morningstar.net (www.morningstar.net), the Web site of the venerable publisher of mutual fund analyses. It provides free Quick Take Reports on 7000 mutual funds and 7500 stocks. These reports provide a gold mine of data for would-be investors, including descriptive profiles, financial statements, performance returns, valuation models, and recent news stories. The fund reports include performance statistics, Morningstar ratings, the fund's top holdings, and management information. An especially neat feature is the Morningstar Style Box, a visual representation ▶



MORNINGSTAR.NET gives loads of data, besides Morningstar's famous mutual fund star ratings.

contribution before investing. ····· Check the Web sites of public companies for investor information. ····

• ANALYST •



• MANAGER •

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	CRT/VIS*	Max Res	CRT Type	Pitch
MultiSync E500™	15"/13.8"	1280 x 1024 @ 65Hz	CromaClear®	0.25mm mask
MultiSync E700™	17"/15.6"	1600 x 1200 @ 65Hz	CromaClear	0.25mm mask
MultiSync E1100™	21"/19.8"	1600 x 1200 @ 65Hz	Dot Trio	0.28mm dot (0.24mm horizontal)

Each MultiSync E Series monitor is compatible with PC and Macintosh® computers, includes digital OSM™ on-screen controls and features a 3 year limited warranty.

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provide the superior, lifelike, color saturated images and super high resolutions and refresh rates to handle all your critical business applications. And they do all this with the MultiSync quality only NEC Technologies can deliver. Qualities any busy business person can appreciate, no matter where you fit within your company's organization chart.

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of the fundamental statistics of a stock or fund.

If you want to find out why one of your stocks reported an unexpected loss last quarter, you'll need to check out EDGAR (Electronic Data Gathering and Retrieval), the system that companies use to file reports with the SEC. The compilation of annual and quarterly filings is a good place to discover details about a company's operations.

Free filings. The SEC manages its own EDGAR database at its official Web site (www.sec.gov), where company filings are available for free—but not until 24 hours after the SEC has received them. An alternative source of data is FreeEDGAR (www.freeedgar.com), which offers real-time access to filings. FreeEDGAR takes the raw text of the filings and rearranges it into a format that's much easier to view. Microsoft Excel 97 users can download an add-in program that turns the spreadsheet into a browser and automatically pulls in data from FreeEDGAR. The site also offers a customized e-mail watch list to notify you when filings are made for companies you're tracking. And it's all free.

Of course, not everything online is free. In general, if you want to obtain more analysis and less raw data, you'll have to pay for it. And once you've located a promising stock or mutual fund, you'll probably want an expert's opinion to bolster—or denigrate—your choice. InvesTools (www.investools.com) is an affordable source of opinions. This site is made up of content from third-party providers such as newsletter publishers, research services, and financial advisers. You don't need to buy pricey subscriptions to access this information; if you prefer, you can purchase it on an à la carte basis. Prices range from 25 cents for a news story to $50 and up for some research reports.

Two of the best for-pay sites are TheStreet.com (www.thestreet.com) and Quote.com (www.quote.com). Both are ideal for serious, active investors. TheStreet.com costs $6.95 per month ($9.95 if you want a daily e-mail bulletin). Some of its features—including news, quotes, and basic commentary—are free, but you'll pay extra for the really good stuff, including financial models and other analyses.

Real-time quotes. Quote.com's basic package costs $9.95 a month. If you just can't accept the normal 20-minute delay on most free sites, you can get real-time stock prices at the site, but you'll have to sign up for the $99.95-per-month premium package. Most of what Quote.com delivers—including portfolios, charts, news, and even annual reports—can be had for free elsewhere if you apply yourself. If you simply can't live without real-time quotes, you should consider picking them up for free at Thomson Real-Time Quotes (www.thomsonrtq.com).

Pick an Online Brokerage

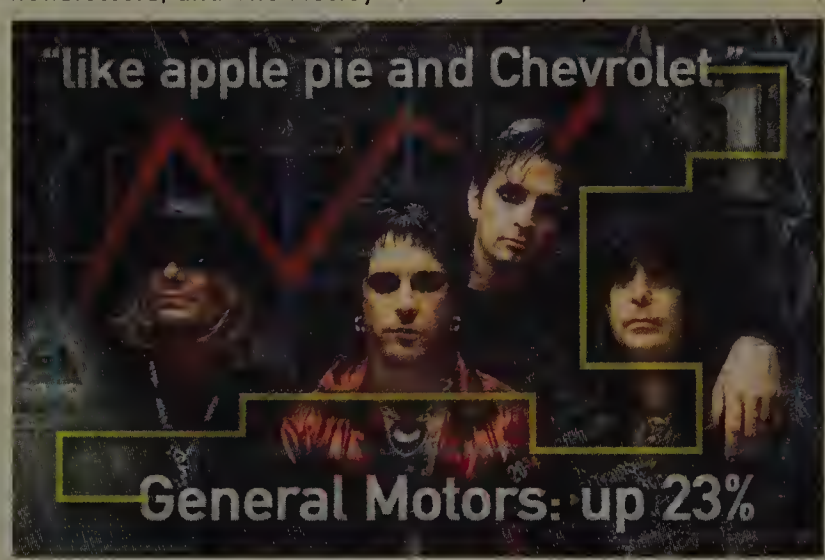
IF YOU'RE ready to buy a few shares of stock, you'll need a broker. Despite occasional glitches like overloaded servers, online brokerages are attractive. They take commissions as low as $8 per trade and offer round-the-clock access to your portfolio—as well as free research, charts, and stock quotes. You can choose from established names like Charles Schwab (www.schwab.com) or relative upstarts like Datek (www.datek.com). Minimum commissions typically range from $8 to $29 per transaction, and they may cost even less in some cases: Web Street Securities (www.webstreetsecurities.com) charges its customers no commissions on Nasdaq market orders

Motley **Fool** Meets

Can you get rock-solid stock tips on th

Everywhere you look on the Internet, someone has a stock tip for you. But is the advice that's being offered any good?

As an informal experiment, we compiled mini-portfolios using advice culled from an investment newsgroup, stock-picking Web sites, electronic newsletters, and The Motley Fool, one of the Web's most popular sources of stock information. Then, to see how these cybertips compared to old-world methods, we asked professionals at MFS Investment Management, the nation's oldest mutual fund company, for some of their picks. And finally, we made a series of picks at random—by scanning the lyrics of rock band Mötley Crüe for company references.



Wouldn't you know it? The random picks based on Mötley Crüe's lyrics fared the best. So should you start consulting heavy metal songs for investment advice? Not necessarily. Remember: Past performance is no guarantee of future earnings. Our Mötley Crüe portfolio excelled because it contained the stocks of large companies like General Motors, which performed well at the end of 1997 while other companies' stocks

ILLUSTRATION: JEFF BERLIN

Set aside money for investing on a regular basis. ····· Don't go looking for a tax loss. Nobody ever got rich

Mötley Crüe

nternet? Well, yes and no.

suffered fallout from Asia's economic woes. If there's a lesson to be learned, it's that blue-chip stocks make good investments.

Lesson number two: Don't pay much attention to what you read in Usenet newsgroups. The recommendations we took from misc.invest.stocks lost over 30 percent. In newsgroups, you never know the source of the tip, so following advice there is like picking a stock at random.

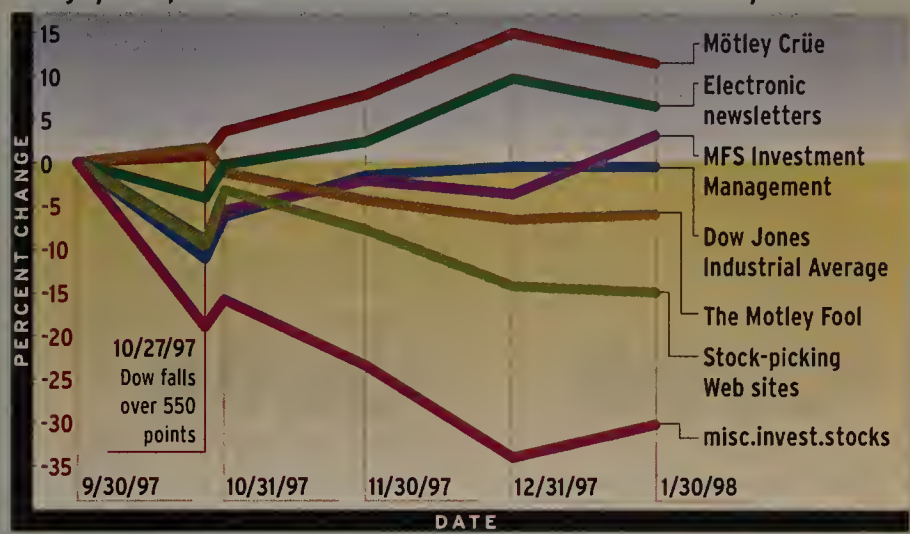
As for Web sites and electronic newsletters, what can we say? Sometimes they're right; sometimes they're wrong. We got a good pick called Dycom from Cousin Bob's Stock Picks. But Netscape, which we culled from Henry Weingarten's Astrologer's Fund, tanked. The biggest winner among all the stocks we tracked was 3D chipmaker 3Dfx, which we got from The TJK Market Letter, written by a recent graduate of Brown University. But a second pick we took from the same newsletter, Activision, went down in price.

Even The Motley Fool, usually an excellent source of advice, isn't right all the time. Our mini-portfolio, gleaned from what The Motley Fool calls its Boring Portfolio, was dragged into the red by one huge loser—Green Tree Financial—even though another of The Fool's picks, Cisco, rose 30 percent.

In short, use the Internet for research, not surefire picks. If you decide to follow the advice of an online resource, make sure that you investigate how the resource came up with the pick and see if you agree. And if you don't want to do all the homework required for picking stocks online, there are always flesh-and-blood professionals who'll do the research for you. The folks at MFS Investment Management put together a portfolio for us that went up in January and at press time was showing encouraging signs of really taking off. —Brad Grimes

Blüe Chip Crüe

Song lyrics provided sound investment advice in a rocky market.



How We Picked Them. Each portfolio was composed of five stocks and tracked from market close on September 30, 1997, until market close on January 30, 1998. The picks were taken from their respective sources just prior to September 30. The stock-picking Web sites we looked at were: Cousin Bob's Stock Picks (www.stocksite.com), Henry Weingarten's Astrologer's Fund (www.afund.com), Inside Wall Street (www.insidewallstreet.com), and The Short Term Stock Selector (www.flash.net/~hesler). The electronic newsletters we looked at were: Jack's Picks (www.jackm.com), The Napeague Letter (www.napeague.com), The TJK Market Letter (www.oursquare.com/members/tjk), and Weekly Economic Update (www.stockresearch.com). For a detailed list of the stocks held in each portfolio, plus an analysis by Joel Tepp, vice president at a national stock brokerage firm, visit PC World Online (www.pcworld.com/may98/invest).

of 1000 shares or more.

The savings add up fast. Joe Barocio, a manager at an electronics manufacturing firm in Lewisburg, Tennessee, had used full-service brokers for 33 years. In 1994, annoyed at poor investment advice and high commissions, he decided he'd rather switch than fight. Barocio eventually opened accounts at three discount online brokerage firms; he estimates that he has saved $3500 in commissions as a result. "Brokerage fees have ceased to be a consideration in my investment decisions," he says. "What used to be 4 percent is now usually under 1 percent."

The strategy of using several brokers is not uncommon. It allows you to take advantage of different resources while minimizing commissions. If you plan to make lots of trades, you might consider opening an account with a dirt-cheap brokerage; for a less active (but more important) retirement account, you should probably go with a more expensive firm that offers lots of research.

Another new benefit of online brokers is easier access to initial public offerings. Getting customers in on the ground floor with a company has traditionally been the province of full-service brokerages, but now discount brokers such as Schwab, E-Trade (www.etrade.com), and DLJ Direct (www.dljdirect.com) are beginning to make IPOs available to their online account holders. New sites like IPO.com (www.ipo.com) that specialize in IPOs are also popping up.

No IPO for you. There's no sure thing, though. Just because a company is going public doesn't mean your brokerage can sell you the new stock. And since IPO shares are subject to various kinds of offer restrictions, small investors may still find themselves shut out of the deal.

To get started trading online, all you need is a Web browser that supports the Secure Sockets Layer protocol—as Netscape Navigator 3.0 and Microsoft Internet Explorer 3.0 and later do. Opening an account is simple. Some online firms, like DLJ Direct, have even dispensed with the formalities of paper application forms, allowing users to open a new account on the site with just a few mouse clicks and keystrokes. Other companies still require you to fill out a paper application, but they provide the necessary forms on their Web site so you can download and print them.

Of course, you'll need to add some cash to your new account before buying any stock. Send a check or have your bank wire funds to get started trading. ▶

rom selling stocks at a loss. ····· Invest in industries you know about. ····· If the market tanks, stay calm. ····►

DELL INSPIRON NOTEBOOKS

Common features: ◆ Modular Options Bay accepts 24X Max^^ Variable CD-ROM, 3.5" Floppy Drive (both included) or Optional 2nd Smart Li-Ion Battery ◆ 512KB L2 Pipelin ◆ Zoom Video and USB Ports ◆ Smart Lithium Ion Battery ◆ Cardbus Ready/Fast IR1.1 ◆ MS® Windows® 95 ◆ ***FREE* MS Windows 98 Upgrade Packet** ◆ MS Interne

***NEW* DELL INSPIRON 3200 D266XT** **266MHz PENTIUM® II PROCESSOR** FEATURING MMX™ TECHNOLOGY	***NEW* DELL INSPIRON 3200 D266XT** **266MHz PENTIUM II PROCESSOR** FEATURING MMX TECHNOLOGY	***NEW* DELL INSPIRON 3200 D233XT** **233MHz PENTIUM II PROCESSOR** FEATURING MMX TECHNOLOGY	**DELL INSPIRON 3000 M233XT** **233MHz PENTIUM PROCESSOR** WITH MMX TECHNOLOGY
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Business Lease◊: $147/Mo., 36 Mos. Order Code #890401	Business Lease◊: $136/Mo., 36 Mos. Order Code #890403	Business Lease◊: $121/Mo., 36 Mos. Order Code #890405	Business Lease◊: $114/Mo., 36 Mos. Order Code #890407

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DELL LATITUDE CP M233XT **233MHz PENTIUM PROCESSOR** WITH MMX TECHNOLOGY	**DELL LATITUDE CP M233XT** **233MHz PENTIUM PROCESSOR** WITH MMX TECHNOLOGY	**DELL LATITUDE CP M233XT** **233MHz PENTIUM PROCESSOR** WITH MMX TECHNOLOGY	**DELL LATITUDE CP M233ST** **233MHz PENTIUM PROCESSOR** WITH MMX TECHNOLOGY
NETWORK-TAILORED NOTEBOOK Common features listed above plus: • 13.3" XGA Active Matrix TFT Display • 128MB EDO RAM • 4GB Ultra ATA Hard Drive • 128-bit Graphics Accelerator with 65K Colors at 1024x768 • 56K Capable$^{\pi}$ K-Flex Modem • C-Port Advanced Port Replicator with 3Com 10/100 Fast Ethernet Adapter • Deluxe Nylon Carrying Case • MS Windows NT® Workstation 4.0 • 6.4 Pounds*	NETWORK-TAILORED NOTEBOOK Common features listed above plus: • 13.3" XGA Active Matrix TFT Display • 80MB EDO RAM • 4GB Ultra ATA Hard Drive • 128-bit Graphics Accelerator with 65K Colors at 1024x768 • 56K Capable$^{\pi}$ K-Flex Modem • Leather Carrying Case • 6.4 Pounds* ★ *Upgrade to 128MB EDO RAM, add $299.* ★ *Upgrade to MS Windows NT Workstation 4.0, add $85.*	NETWORK-TAILORED NOTEBOOK Common features listed above plus: • 13.3" XGA Active Matrix TFT Display • 64MB EDO RAM • 4GB Ultra ATA Hard Drive • 128-bit Graphics Accelerator with 65K Colors at 1024x768 • 6.4 Pounds* ★ *Upgrade to 96MB EDO RAM, add $199.* ★ *C-Port Advanced Port Replicator with 3Com 10/100 Fast Ethernet Adapter with Monitor Stand, add $349.* ★ *56K Capable$^{\pi}$ K-Flex Modem, add $199.*	NETWORK-TAILORED NOTEBOOK Common features listed above plus: • 12.1" SVGA Active Matrix TFT Display • 48MB EDO RAM • 3.2GB Ultra ATA Hard Drive • 128-bit Graphics Accelerator with 16 Million Colors at 800x600 • 56K Capable$^{\pi}$ K-Flex Modem • 5.9 Pounds* ★ *Upgrade to a 4GB Ultra ATA Hard Drive, add $99.* ★ *2nd Smart Lithium Ion Battery, add $169.* ★ *Deluxe Nylon Carrying Case, add $69.*
$4699	**$3999**	**$3599**	**$3299**
Business Lease◊: $173/Mo., 36 Mos. Order Code #890402	Business Lease◊: $147/Mo., 36 Mos. Order Code #890404	Business Lease◊: $132/Mo., 36 Mos. Order Code #890406	Business Lease◊: $121/Mo., 36 Mos. Order Code #890408

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DELL INSPIRON 3000 M233ST **233MHz PENTIUM PROCESSOR** WITH MMX TECHNOLOGY	**DELL INSPIRON 3000 M200ST** **200MHz PENTIUM PROCESSOR** WITH MMX TECHNOLOGY
Common features listed above plus: • 12.1" SVGA Active Matrix TFT Display • 48MB SDRAM • 3.2GB Ultra ATA Hard Drive • 128-bit Graphics Accelerator with 16 Million Colors at 800x600 • MS Office 97 Small Business Edition • 6.4 Pounds* ★ *Upgrade to 80MB SDRAM, add $199.* ★ *Upgrade to a 4GB Ultra ATA Hard Drive, add $99.* ★ *56K Capable™ K-Flex Modem, add $199.*	Common features listed above plus: • 12.1" SVGA Active Matrix TFT Display • 32MB SDRAM • 3.2GB Ultra ATA Hard Drive • 128-bit Graphics Accelerator with 16 Million Colors at 800x600 • MS Office 97 Small Business Edition • 6.4 Pounds* ★ *Upgrade to a 233MHz Pentium Processor, add $200.* ★ *Upgrade to 64MB SDRAM, add $199.* ★ *Upgrade to a 4GB Ultra ATA Hard Drive, add $99.*
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DELL LATITUDE CP M233ST **233MHz PENTIUM PROCESSOR** WITH MMX TECHNOLOGY	**DELL LATITUDE CP M200SD** **200MHz PENTIUM PROCESSOR** WITH MMX TECHNOLOGY
NETWORK-TAILORED NOTEBOOK Common features listed above plus: • 12.1" SVGA Active Matrix TFT Display • 32MB EDO RAM • 3.2GB Ultra ATA Hard Drive • 128-bit Graphics Accelerator with 16 Million Colors at 800x600 • 5.9 Pounds* ★ *Upgrade to 64MB EDO RAM, add $199.* ★ *Upgrade to a 4GB Ultra ATA Hard Drive, add $99.* ★ *56K Capable™ K-Flex Modem, add $199.* ★ *Leather Carrying Case, add $99.*	NETWORK-TAILORED NOTEBOOK Common features listed above plus: • 12.1" Fast Response Dual Scan Display • 32MB EDO RAM • 2.1GB Ultra ATA Hard Drive • 128-bit Graphics Accelerator with 16 Million Colors at 800x600 • 5.9 Pounds* ★ *Upgrade to 48MB EDO RAM, add $99.* ★ *Upgrade to a 3.2GB Ultra ATA Hard Drive, add $99.* ★ *56K Capable**x2 Modem, add $149.* ★ *2nd Smart Lithium Ion Battery, add $169.*
$2999 Business Lease◊: $114/Mo., 36 Mos. Order Code #890410	**$2299** Business Lease◊: $87/Mo., 36 Mos. Order Code #890412

If it's speed you want, then speed you'll get. Dell's new line of Inspiron™ 3200 notebooks feature the Intel Pentium® II processor – the fastest mobile processor available from Intel. And best of all, you don't have to spend extra for the latest technology. Not only will you get the fastest mobile Pentium II processor available, up to 266MHz, you will also get SDRAM, the fastest mainstream memory technology. To top that off, the Ultra ATA hard drives can transfer data twice as fast in burst mode as normal ATA hard drives. And, if that doesn't blow you away, then maybe the 13.3" XGA active matrix display and 3D surround sound will. The new Dell® Inspiron 3200 notebook with a Pentium II processor allows you to up the ante and hold on to your wallet. To take advantage, give us a call or stop by our website.

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Many online brokers will open an account with no minimum balance, though some do require an initial investment of $1000 to $10,000 (and sometimes more). If you already have a brokerage account, your new online broker will gladly take care of transferring your cash and securities from the old firm.

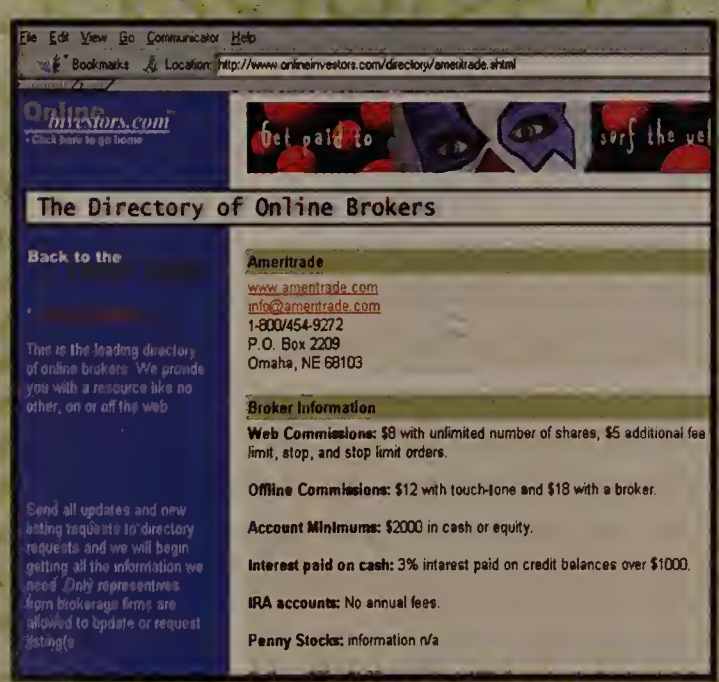
*What are the **downsides** to using online brokers? Many firms charge **fees** for some services. And trading online **may not be as reliable as** the brokers would have investors believe.*

Mind the pitfalls. The downsides to using online brokers? First, many firms charge fees for some services, such as sending stock certificates to you, closing an account, or even letting you place an order by phone instead of from the Web site. Second, the firm with the lowest minimum commission may not be the cheapest broker. Some companies levy additional charges for large trades—say, 5000 shares or more—raising the commission well above the advertised minimum. Check the commission and fee schedules of online brokers carefully.

And third, as the market crash last October demonstrated, trading with online brokers may not be as reliable as those companies would have investors believe. Clients reported that they found it nearly impossible to get through to several online brokerage sites, spawning an SEC inquiry into the capacity of these firms, as well as at least one class-action lawsuit filed by disgruntled investors. Companies are promising to add more servers to handle the heavier Web traffic. Some, like Charles Schwab, say that online investors can now trade over the phone—or even at a Schwab office—for the same fee as trading online, if their Web sites are overloaded.

Major decisions. Which online brokerage should you choose? We didn't have the funds to open accounts at all of them, so we can't say for sure. But some Web sites monitor the online brokers and offer advice and information; OnlineInvestors.com (www.onlineinvestors.com) is one of the best. It gives background information on brokers, makes recommendations, and fields complaints from users.

Another excellent site for uncovering facts about brokers is Gomez Advisors (www.gomezadvisors.com). One feature of its home page is the Internet Broker Scorecard, which lists the current top five online brokerages. Rankings are based on a variety of factors, including ease of use, consumer confidence, and overall cost. As this article went to press, Gomez Advisors' favorite online brokers included Web Street Securities, E-Trade, and DLJ Direct. Circumstances change quickly in the investment world, however, so be sure to consult the Gomez site yourself for the latest news and rankings.



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Avoid Investment Scams

With the rapid growth of online investing, it's only natural that crooks should recognize opportunities of their own on the Internet. Last year, SEC chair Arthur Levitt told a group about a con artist who convinced credulous Net users to invest in eel farms that did not exist.

Other scams may not be so obvious. Beware of stock newsletters—some are nothing more than glorified online infomercials, for which companies pay to have their stocks promoted.

Online discussion groups are another area rife with fraud. One common ploy is the *pump and dump.* An individual, or a group of people working in cahoots, posts a message touting a stock. As the excitement fueled by the tipsters grows, the share price is pumped up. When the stock's price reaches new heights, the promoters dump their shares. The share prices then fall, leaving later investors with only pennies on each original investment dollar.

How can you protect yourself? Use common sense and a healthy dose of cynicism. To find out whether a Web site or newsletter has been paid to recommend a stock, read the fine print. Then research every investment thoroughly. If you suspect you've been victimized by a deception—or if you just want to stave off the rogues in advance—check out these sites:

- **The Enforcement Division of the Securities and Exchange Commission** (www.sec.gov) has Investor Alerts posted that describe common rackets used to defraud online investors. You can also file a complaint here.
- **The National Fraud Information Center** (www.fraud.org) is home to the Internet Fraud Watch, which offers tips for investing and lists the warning signs of potential scams.
- **The Investor Protection Trust** (www.investorprotection.org) is an organization that assists in prosecuting investment fraud. It also provides links to articles and resources that can help you become a smarter investor.
- **The Stock Detective** (www.stockdetective.org) keeps an eye on stock promoters operating on the Web and regularly exposes flagrant examples of abuse and fraud.

Ironically, investor greed is what makes most deception possible in the first place. So don't abandon common sense in pursuit of a quick buck. When someone online tells you about an extraordinary opportunity, don't forget: It might turn out to be an eel farm. —D.G.

usually you just have to register at the site. But our favorite portfolio manager is at Yahoo Finance (quote.yahoo.com).

Fast stock access. With its plain and easy-to-navigate user interface, Yahoo Finance is one of the Web's simple pleasures. It offers access to an unlimited number of portfolios with unlimited securities in each, all presented in a clean, straightforward way. The minimalist design ensures that pages load quickly. You can view your portfolio in several formats and easily link to additional research about any stock, including charts and news items. (Current stories and quotes are delayed by 15 or 20 minutes.) Yahoo Finance also gives you the option of downloading your portfolio into a spreadsheet or importing it into a personal finance program.

Besides using your Web browser to track your portfolio, you can also arrange to have the information e-mailed to you daily. InfoBeat (www.infobeat.com) is a free, personalized e-mail service that delivers news, weather reports, sports headlines, and financial information to subscribers. Its InfoBeat Finance service sends a daily report with closing quotes and news for up to three portfolios in any of several formats, including an attached file suitable for importing into Quicken or a spreadsheet. InfoBeat is free to users, but each e-mail message includes a brief advertisement that some people may find annoying, though it isn't terribly intrusive.

Beware the ides of April. Regrettably, Web portfolio trackers lack record-keeping features you'll need at tax time. To see details on taxable gains, dividends, and losses, you'll need to use a software program like Quicken or Money, and you'll have to record every transaction in your portfolio by hand.

Join a Club

IF LONE-WOLF investing isn't your style, you might want to join an investment club. There are over 33,000 investment clubs in the United States, all composed of like-minded individuals who pool their funds and invest in a single portfolio as a sort of mini–mutual fund.

Besides advancing your investment education, a club may prove financially profitable to you. Each year, according to the National Association of Investors Corporation, the percentage of investment clubs that outperform the Standard & Poor's 500 is higher than the ▶

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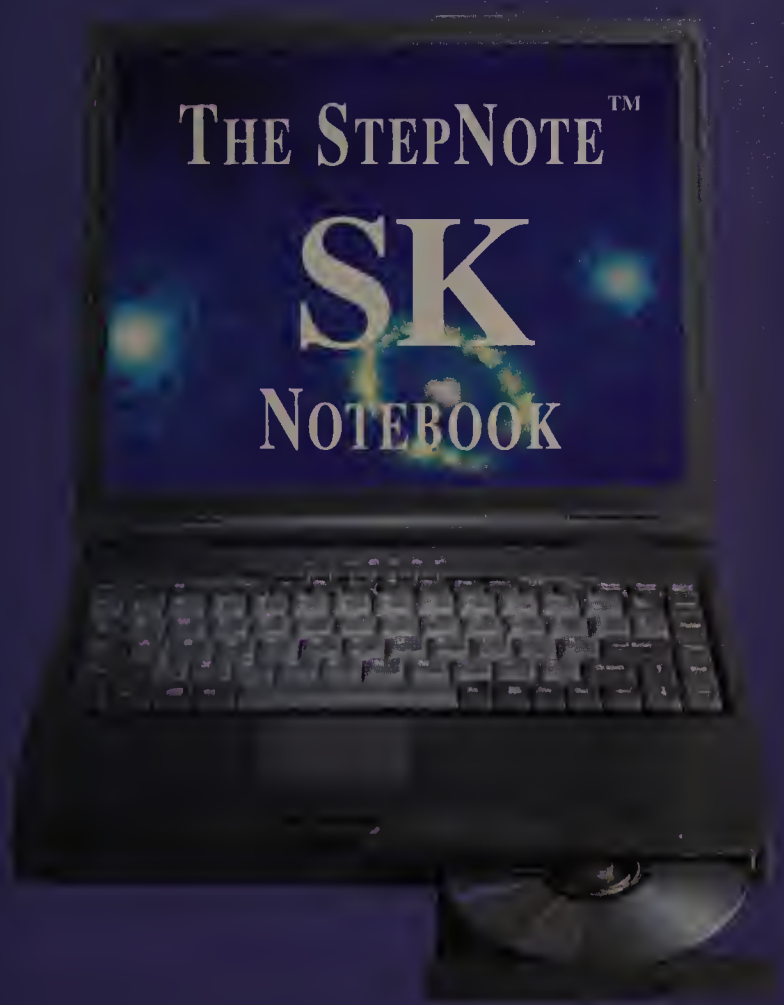

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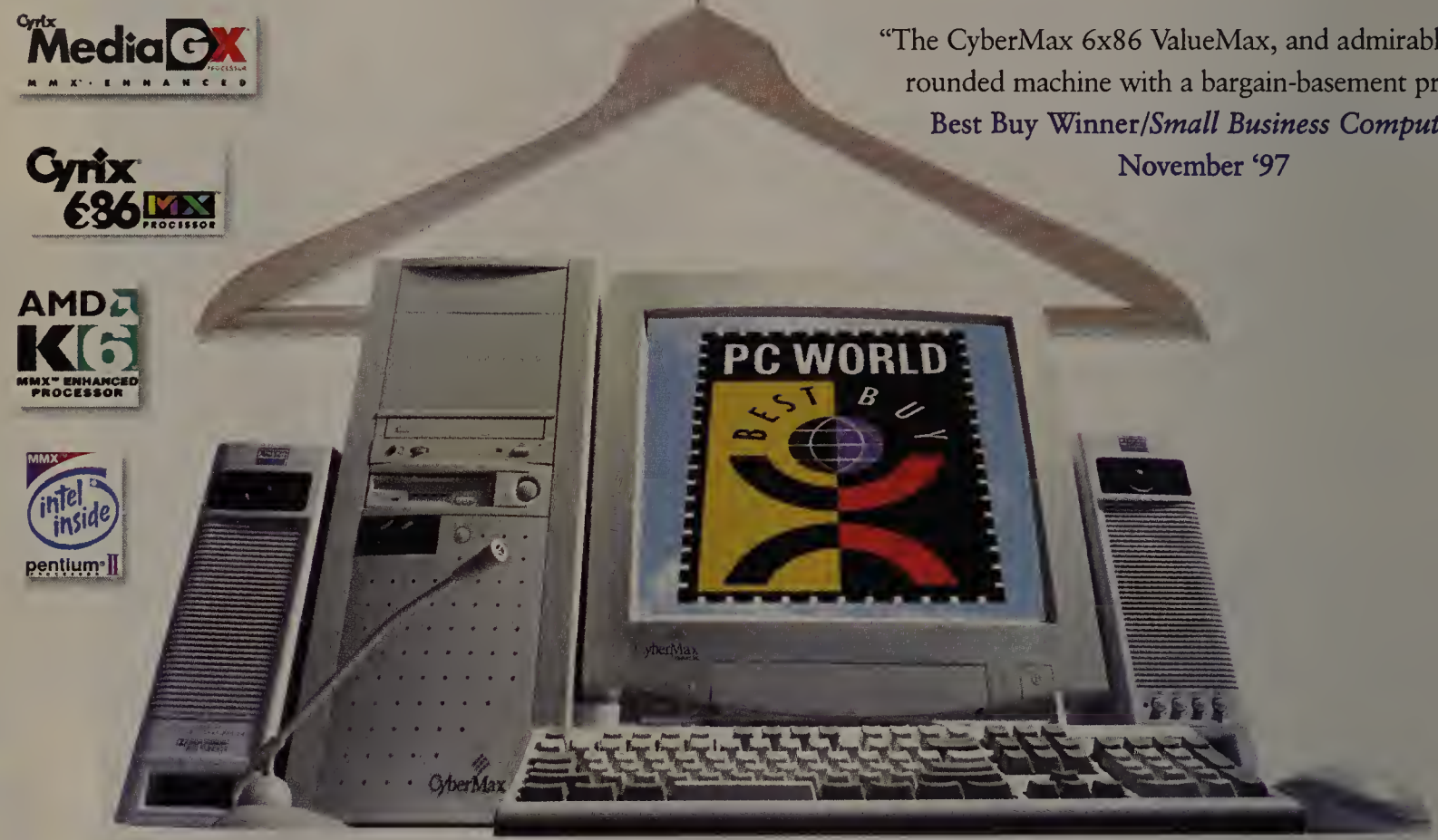

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percentage of professionally managed mutual funds that do.

These days, a great many investment clubs operate exclusively online. Using message boards, mailing lists, and Web pages, the club's members buy and sell stocks in a single portfolio but may never meet other members face to face.

One of the oldest online clubs, the six-year-old Windy City Investment Club, boasts a portfolio worth over $200,000. What makes meeting online better than meeting in person? According to Windy City member Robert Boroughf of Reno, Nevada, immediacy is the appeal: "It's like having 30 meetings each month instead of just one. If the fundamentals of one of our holdings change, the next day you can trust that some member has caught this change and posted a message." In addition, members aren't bound by geographical limitations.

Get the ball rolling. NAIC has been helping interested individuals form investment clubs for more than 45 years. Its Web site (www.better-investing.org) offers complete instructions for starting a club and operating it successfully.

More than 120 investment clubs have sites on the Web. But because rules forbid the clubs from advertising to attract new members, the sites can be difficult to find. Try going to a search engine like Yahoo and search on **investment clubs**—you're sure to get lots of leads.

Shun False Prophets

WHEN YOU tackle Wall Street online, you will probably want to share ideas with other investors. There are a number of Usenet newsgroups where investors can meet to share insights, but these carry little more than noise and hype, making them a hotbed for penny-stock promotions and other spurious claims (see "Avoid Investment Scams"). To get an idea of what a *bad* dialogue about investments is like, browse around for a while in misc.invest.stocks and misc.invest.mutual-funds.

To occupy the void left regrettably vacant by inane newsgroups, several online discussion boards have been launched. The Silicon Investor (www.techstocks.com) is one of the oldest financial sites on the Web—and also one of the busiest, with more than 300,000 messages posted on its discussion boards each month. As its name and URL imply, The Silicon Investor focuses primarily on technology stocks, but boards devoted to dozens of other sectors and topics are also available at the site. Anyone can read messages on the SI discussion boards, but to post messages you must be a member, which requires a $200 lifetime fee.

The Motley Fool is also a good source of stock talk. But be warned: Its discussion areas are sometimes overwhelmed by Foolishness—aimless, disjointed spouting-off by loyal adherents to the Fool philosophy of investing.

One danger of discussion boards, warns veteran online trader Jim DePorre, is that one investor's exuberance can tip the scales for others looking at the same stock—often inappropriately. "The stock boards on America Online and The Silicon Investor site provide good sources for information about individual stocks," DePorre says. "But often they serve as a means for people to reassure themselves about a stock they're already committed to, and they end up being cheerleaders rather than sources of objective information." But if you've armed yourself with even a fraction of the information the Internet has to offer, you're less likely to be swayed by the hype that sometimes appears in online discussion areas.

Don't miss out. Arming yourself with the right information is the key to online investing. You won't necessarily become rich, but DePorre is adamant that every investor should be online. "The Internet levels the playing field and allows you to know as much as the professionals. It is empowering to have all the information and tools at your disposal," he says. "If you want to control your own investing future, you have to be on the Net."

For more about our stock portfolio visit www.pcworld.com/may98/invest. Douglas Gerlach is the author of Investors Web Guide *(Lycos Press); the creator of Invest-O-Rama, a financial Web site; and senior editor of The Armchair Millionaire site. Brad Grimes is a senior associate editor for* PC World. ■

***"Brokerage fees** have ceased to be a **consideration** in my investment decisions. What used to be **4 percent** is now **under 1 percent.**"*

JOE BAROCIO, online investor

PHOTOGRAPH: ROB LINGLE

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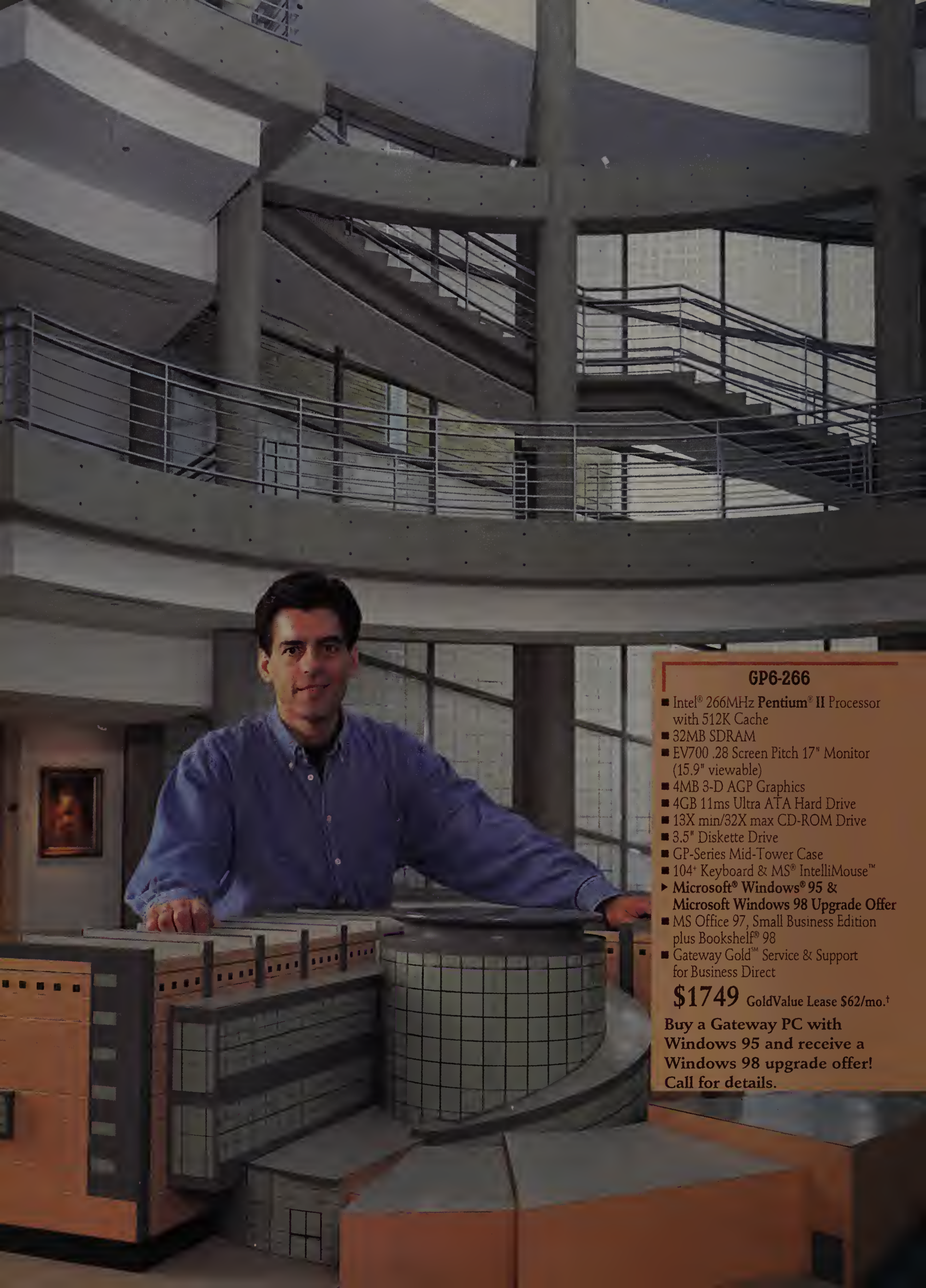

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Pictured left to right: GATEWAY™ GP-Series PCs with desktop and mid-tower cases.

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- Intel 333MHz **Pentium II** Processor with 512K Cache
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- EV700 .28 Screen Pitch 17" Monitor (15.9" viewable)
- 8MB 3-D AGP Graphics
- 6.4GB 10ms Ultra ATA Hard Drive
- 13X min/32X max CD-ROM Drive
- 3.5" Diskette Drive
- GP-Series Mid-Tower Case
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Pictured left to right: Solo 9100, 5100 and 2300 PCs.

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- Modular 3.5" Diskette Drive
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Solo 9100, *PC Magazine* Editors' Choice Award, January 1998

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NO Hassle Hookups

Could it be that real plug-and-play is here?

Our latest tests connecting USB peripherals were mostly problem-free.

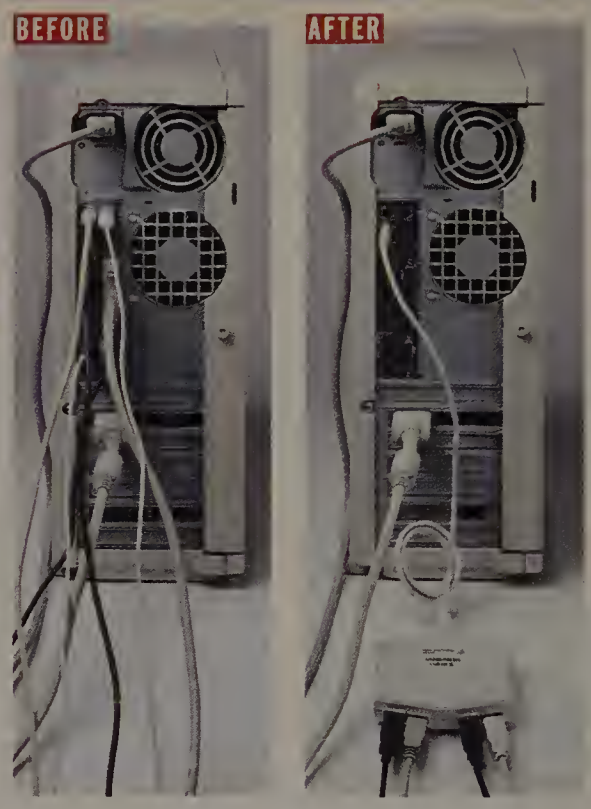
BY DAVID ENGLISH

USB? OH NO, not another computer connector! You already have trouble finding your way through the current maze of wires on the back of your PC. Isn't it enough to match the round plug with the round jack and the oblong plug with the oblong jack? Why can't PC manufacturers leave well enough alone?

We agree. But as you may have heard, Universal Serial Bus is different. This new industry standard features a one-size-fits-all connector to replace all the other ports on your PC. You can plug just about anything into a USB port: monitors, keyboards, mice, modems, joysticks, printers, scanners, video cameras. What's more, you can plug some USB

PHOTOGRAPHS BY PIERRE-YVES GOAVEC

real plug-and-play



BEFORE USB, plugging in a device was like playing pin-the-tail-on-the-donkey: You shut your eyes and hoped the connector fit. Virtually all PCs suffer from a tangle of cables (left). USB cleans up your PC's expansion act. An inexpensive hub, like that shown at right, places ports where you need them; you can even plug USB devices into each other.

A USB CONNECTOR means you won't have to swap out competing serial port devices or work with unreliable parallel port pass-throughs. Any device plugs into any port.

peripherals into each other, which means you can have a string of equipment all running off a single port on your PC—no more groping around the back of the case, looking for another connector. Some USB products, such as scanners and digital cameras, even work without a separate power cord—the USB wire can deliver electrical power. Finally, USB lets you install and remove peripherals without restarting the PC.

MOST IMPROVED

UNTIL RECENTLY, USB hardware was as scarce as hen's teeth. Now, after almost two years of foot-dragging, hardware companies are finally delivering peripherals. We tested 18 of these new products, installing them on at least one of two Pentium II–based Dell Dimension XPS D233 PCs, one running Windows 95, the other with Windows 98 beta release 3. Wherever possible, we used Win 95 to test products; we used Windows 98 for those devices lacking Windows 95 drivers.

It's clear that USB hardware has come a long way since our last look (see "Universal Serial Bus Flops in First Hands-On Tests," September 1997), when the devices crashed our PC and often refused to have anything to do with each other. This time we tested three times as many products, and were able to mix and match them without hassle. We were also able to hot-swap peripherals, plugging and unplugging devices without restarting the PC.

Unfortunately, unless you upgrade to Windows 98, you may be out of luck. While vendors can write driver software for Windows 95, the task of ensuring full compatibility under Win 95 is quite complex. As a result, most vendors are waiting for Windows 98, which comes with USB support and drivers built in. With Windows 98 expected around June, many USB peripherals will never be made to work with Windows 95.

Windows 98 will include generic "class drivers" for all manner of USB devices, so they may be recognized and enabled without requiring a separate installation disk. In our tests, the class drivers in our Windows 98 beta worked flawlessly. Manufacturers can enhance feature sets with so-called minidrivers, which add capabilities on top of the generic driver supplied by Microsoft. For example, a joystick-class driver could support four standard buttons, while a minidriver might add support for hat buttons and throttle controls. Expect Windows 98 to include general class drivers and specific minidrivers for many USB peripherals.

So exactly how many USB products are out there? Stephen Whalley, chairman of the USB Implementers Forum, estimates that only about 30 peripherals will be available by early April, but that number should grow to approximately 60 by the end of the year. "I expect that there will be just a handful introduced every month now, until Windows 98, when it will accelerate," says Whalley.

living with usb

USING THE UNIVERSAL SERIAL BUS beats playing hot potato with serial and parallel ports, but users may still confront some problems. Here's how to make life with the new bus less stressful.

1 Waiting for Windows. If you're running Windows 95, make sure the USB devices you buy come with drivers to work with it. (Many USB products require the upcoming Windows 98.)

2 Set your ports. When you install a new USB device, initialize it on all available USB ports. This step will eliminate trouble later; plugging a USB peripheral into an uninitiated port could lead to a system crash or at least a time-consuming initialization routine.

3 Avoid dead ends. USB is able to connect peripherals together in a chain, but most devices sold today don't provide a second port for supporting additional devices. If you want to string hardware together, make sure you buy products that have at least two ports.

4 Bask in your power. USB may free us from the tyranny of power cords, but your PC's USB bus can handle the power needs of only a few devices. If you intend to hang more than four USB-powered devices off your PC's USB port, one of those devices must be a self-powered hub, which supplies extra juice to other hungry peripherals. But remember that not all hubs are self-powered: In this review, both the CATC Andromeda hub and the Compaq V75 monitor lack the ability to supplement power on the USB line. Shop carefully.

5 Take to the road. A USB device for your notebook will draw a lot of battery power. You may want to limit use of USB peripherals to those times when you can plug into an AC outlet.

—Michael Desmond

firewire: faster, further, better?

WHEN IT COMES to really challenging stuff, like video capture and plug-and-play home networks, USB's 12-megabits-per-second throughput limit just won't cut it. Enter a speedy little bus with a not-so-snappy name—IEEE-1394, also known as FireWire. It can push up to 400 mbps of data, dwarfing USB performance.

Like USB, FireWire is an external plug-and-play bus that aggregates tasks now served by a variety of connections—in this case fast SCSI peripherals, PCI video capture cards, and even network connections. For example, Sony sells digital camcorders with a FireWire port for moving digital video directly to the PC for display or editing.

BUT WILL IT CATCH ON?

UNFORTUNATELY this über-bus is pretty expensive compared to USB, slowing down its adoption among vendors. Still, BIOS developers AMI and Phoenix have created BIOS code supporting the bus, while the rapidly falling prices for digital camcorders could also spur interest in this superfast external bus. FireWire could get another boost from the DeviceBay initiative, which is supposed to develop modular connections for disk drives and other PC devices.

BUS TYPE	Bandwidth [1]
serial	150 kbps
parallel	1.2 mbps
USB	12 mbps
FireWire	100–400 mbps
SCSI	20–30 MBps

[1] kbps=kilobits per second; mbps=megabits per second; MBps=megabytes per second

Should you wait for FireWire? In almost all cases, no. System and peripheral makers are waiting for connector costs to come down, so you'll have to install a PCI adapter card to get the bus into your PC. And Microsoft hasn't added FireWire to its operating systems yet, diluting prospects for widespread support. It seems that USB will enjoy a long reign as the external bus of choice.

—Jeff Yablon

PORTS FOR DUMMIES

AS PROMISING AS our test results were, USB's rocky start isn't quite over yet. Vendors tout it as the computer bus for dummies, but you still need some smarts to make USB peripherals work together. For one thing, many devices lack a second USB port to connect to other peripherals. You need to shop for products with multiple ports if you wish to daisy-chain your devices. Of the 15 USB-compatible devices we tested, only the three monitors include ports for connecting to other USB devices. With just two USB ports on the back of most PCs, users purchasing a number of peripherals may want to invest in a USB hub—a device that presents two or more ports for plugging in devices. Another alternative is USB monitors, which include a hub for running multiple devices.

Power consumption is another worry. USB eliminates the tangle of power cords by sending power over the bus wire itself—a neat idea. But this method can backfire if you string more than five power-hungry peripherals together. To prevent bus brownouts, use a self-powered hub to augment the power flow. These devices can ensure that your USB scanner, digital camera, force-feedback joystick, and modem don't all overdraw the wire. The catch? You must be sure that the hubs and USB monitors you purchase are self-powered; not all are.

More troubling, under both Windows 95 and Windows 98, several of the peripherals failed after we unplugged them and then reconnected them to a different USB port. Here's the problem: When you first install a USB device, Windows initializes it only for the specific port that you've plugged it into. If you plug the device into another USB port—even if it's on the back of the same computer—Windows will not recognize it. Our advice: Set up each peripheral on all the USB ports in the beginning, so that Windows will recognize your hardware no matter which port you use later.

> The biggest problem with USB continues to be the lack of peripherals.

PUTTING THE YOU IN UNIVERSAL

ONE SIMPLE WAY TO get started with USB is to buy a new computer. Almost all new desktop PCs sold at the end of last year came with two USB ports, and about 80 percent of new notebooks will be USB-equipped by year-end, according to the research firm Dataquest. Owners of older systems can add USB by buying inexpensive adapter cards that fit into a desktop computer's PCI slot or into a notebook's CardBus slot. See page 184 in this article for a review of the CMD CSA-6700, a PCI-to-USB upgrade card, plus reviews of a parallel port–to–USB cable and a standalone hub.

In theory, a USB-equipped PC can handle as many as 127 USB devices, but in fact you're likely to run out of bandwidth or power before coming anywhere close to that limit. The maximum cumulative bandwidth of the bus is 12 megabits per second, which is a more than sufficient amount for a wide range of peripherals such as keyboards, scanners, and even monitor-top video cameras. However, problems can develop when you are running several performance-hungry devices off USB at the same time. A low-end video camera, for instance, can grab 4 to 5 mbps on its own. Add a scanner, a printer, digital speakers, and a modem to that configuration, and you could easily reach the bandwidth limit. The good news is that, based on our limited tests, you won't see a degradation in performance.

The biggest problem with USB continues to be the lack of peripherals. With only a few different USB-equipped models available in each product category, buyers face a narrow selection. The result: The product you really want simply may not be available with USB. We should see a jump in the number of USB peripherals when Windows 98 ships, but it will be a year or more before the selection begins to approach the choices available with other connectors. Most of us will be mixing USB and non-USB peripherals for a long time to come. ▶

a smart buy

Input Devices

UNIVERSAL SERIAL BUS is a natural for input devices. All the products we reviewed worked at least as well as their traditional counterparts. One problem: None of the keyboards we tested included drivers for Windows 95, though compatible products may arrive later this year. Also, none came with additional ports to connect other USB devices.

USB INPUT DEVICES: 1. Microsoft Natural Keyboard Elite, 2. ThrustMaster Top Gun joystick, 3. NMB Technologies RT-2400W keyboard, 4. Magnavox Wireless USB Keyboard with its 5. infrared receiver.

MICROSOFT NATURAL KEYBOARD ELITE

THE LATEST IN Microsoft's well-known line of ergonomic keyboards, the $64.95 Natural Keyboard Elite is really a PS/2 keyboard with a USB adapter module. Installation was uneventful, and the keyboard kept working even after we unplugged and reconnected it several times. It also worked fine alongside a second keyboard plugged into the PC's PS/2 port.

The split keyboard face and off-angle keys are intended to reduce repetitive strain, but that's a matter of opinion—some users liked the design while others struggled with it. In either case, the unorthodox design can take from several hours to several days to get used to. Microsoft Corp., 800/426-9400, www.microsoft.com/products/hardware.htm.

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USB PRODUCTS	Type	Street price	Additional ports	Powered hub	Windows 95 drivers
Microsoft Natural Keyboard Elite	keyboard	$64.95	none	n/a	○
NMB Technologies RT-2400W [1]	keyboard	$39.99	[2]	n/a	○
Magnavox Wireless USB Keyboard	keyboard	$140–$160 [3]	none	n/a	○
ThrustMaster Top Gun	joystick	$45.95	none	n/a	●

● Yes ○ No n/a = not applicable [1]Our pick. [2]PS/2 port for mouse. [3]List price range, per vendor.

NMB TECHNOLOGIES RT-2400W KEYBOARD OUR PICK

A STANDARD FLAT-FACED keyboard with a solid and responsive feel, the RT-2400W installed without incident and operated smoothly alongside a second keyboard connected to the PS/2 port. The RT-2400W includes the familiar Windows 95 keys and has a built-in PS/2 connector for hooking your existing mouse into the keyboard instead of into a PC port. If you need to replace your current keyboard and want to jump onto the USB bandwagon, this low-cost ($39.99) model is an excellent choice. NMB Technologies, 800/662-8321, www.nmbtech.com.

READER SERVICE NO. 685

MAGNAVOX WIRELESS USB KEYBOARD

DO YOU VALUE your freedom? The battery-powered Magnavox Wireless USB Keyboard from Philips lets you work up to 30 feet away from your PC. An infrared transceiver plugs into a USB port.

The Magnavox was the only keyboard that required a reboot during installation. We also found it a bit small for our tastes, with awkwardly placed function and cursor keys. And we struggled with the built-in mouse buttons and pointing device, a thumb-size disc. That said, the device worked well 30 feet from the computer—even in strong daylight, which can sometimes interfere with an infrared beam. The product's name and pricing had not been quite finalized at press time, but it is expected to cost around $150. Philips Consumer Electronics, 800/835-3506, www.philips.com.

READER SERVICE NO. 686

THRUSTMASTER TOP GUN JOYSTICK

THE THRUSTMASTER TOP GUN, the only USB game device that was available for testing, is virtually identical to the non-USB Top Gun model. It's also the only input device here that works with Windows 95. Once we installed the drivers and calibrated the joystick in the Windows Game Controllers applet, the Top Gun USB performed perfectly with Microsoft Flight Simulator 98. It even continued to respond after we unplugged and reconnected the joystick in the middle of game play.

The $45.95 Top Gun is a good flight–oriented joystick, but some users may want a built-in throttle, rudder control, or other goodies. ThrustMaster, 503/615-3200, www.thrustmaster.com.

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small but mighty

Scanners & Video Cameras

USB TAKES THE PAIN OUT of installing scanners and digital video cameras: Gone are testy SCSI configurations and parallel port pass-through connectors. But while USB monitor-top cameras for videoconferencing and simple image capture are in plentiful supply, we found only one USB scanner available: Storm Technology's sheetfed PageScan USB —fortunately, a good product.

USB SCANNERS AND VIDEO CAMERAS: 1. Kodak DVC 300, 2. Intel Create & Share Camera Pack, 3. Connectix QuickCam VC, 4. Kodak DVC 323, 5. Storm Technology PageScan USB.

CONNECTIX QUICKCAM VC

AT $99, THE USB version of Connectix's popular QuickCam VC is the least expensive camera we tested. Installation was a snap: We plugged in the camera and inserted the CD-ROM. But video quality lagged behind that of the other models here, with images that lacked contrast and detail. Connectix, 800/950-5880, www.connectix.com.

READER SERVICE NO. 688

INTEL CREATE & SHARE CAMERA PACK OUR PICK

INTEL'S $199 CREATE & Share Camera provides superior video quality, with higher resolution than the QuickCam and faster frame rates than the Kodak DVC 300 (see next column). But the manual recommends that you shut down the PC before attaching the camera for the first time—unusual for a USB device installation. Unlike with both Kodak units, the Create & Share's software ran smoothly even when the camera was unplugged and then reconnected to our PC. Intel, 800/538-3373, www.intel.com.

READER SERVICE NO. 689

KODAK DVC 300
KODAK DVC 323

KODAK'S $99 DVC 300 and its follow-up, the $169 DVC 323 (still in beta at the time of our testing), impressed us with good video quality and high frame rates. The DVC 323 dished up the most stable video in this review. Unfortunately, these products gave us considerable trouble in our unplug-and-replug test.

After we plugged in the camera and inserted the CD-ROM, the DVC-300 displayed real-time output on screen using the bundled PictureWorks Live application. But video quality fell short of the Intel Create & Share's, and the software lost contact with the device when we unplugged and reconnected the camera into the same port. Plugging the camera into the PC's other USB port froze the system.

The DVC 323 beta fared a bit better. We had to install the bundled software before plugging in the hardware, but the 323 produced the best video output of the group. However, it balked when we unplugged and replugged the connectors, and unplugging the camera while running PictureWorks Live locked up our PC. Kodak, 800/242-2424, www.kodak.com.

READER SERVICE NO. 690

STORM TECHNOLOGY PAGESCAN USB OUR PICK

THE $199.95 PAGESCAN USB wowed us with its convenience and quality. A compact 300-dots-per-inch sheetfed scanner that captures 24-bit color images, it produced sharp images. A nifty autosense feature starts a scan when a piece of paper is fed in. Remarkably, we were able to scan a page within 7 minutes of opening the box—possibly a land-speed record. Scans went smoothly even when we ran several USB devices at once. The unit draws power from its USB wire, eliminating the need for a powerbrick and cord. Though it's the only available USB scanner now, you can feel confident if you go with the PageScan. Storm Technology, 888/438-3279, www.stormtech.com.

READER SERVICE NO. 691

USB PRODUCTS	Type	Street price	Additional ports	Powered hub	Windows 95 drivers
Connectix QuickCam VC	video camera	$99	none	n/a	●
Intel Create & Share Camera Pack [1]	video camera	$199	none	n/a	●
Kodak DVC 300	video camera	$99	none	n/a	●
Kodak DVC 323	video camera	$169	none	n/a	●
Storm Technology PageScan USB [1]	scanner	$199.95	none	n/a	●

● Yes ○ No n/a = not applicable [1]Our pick.

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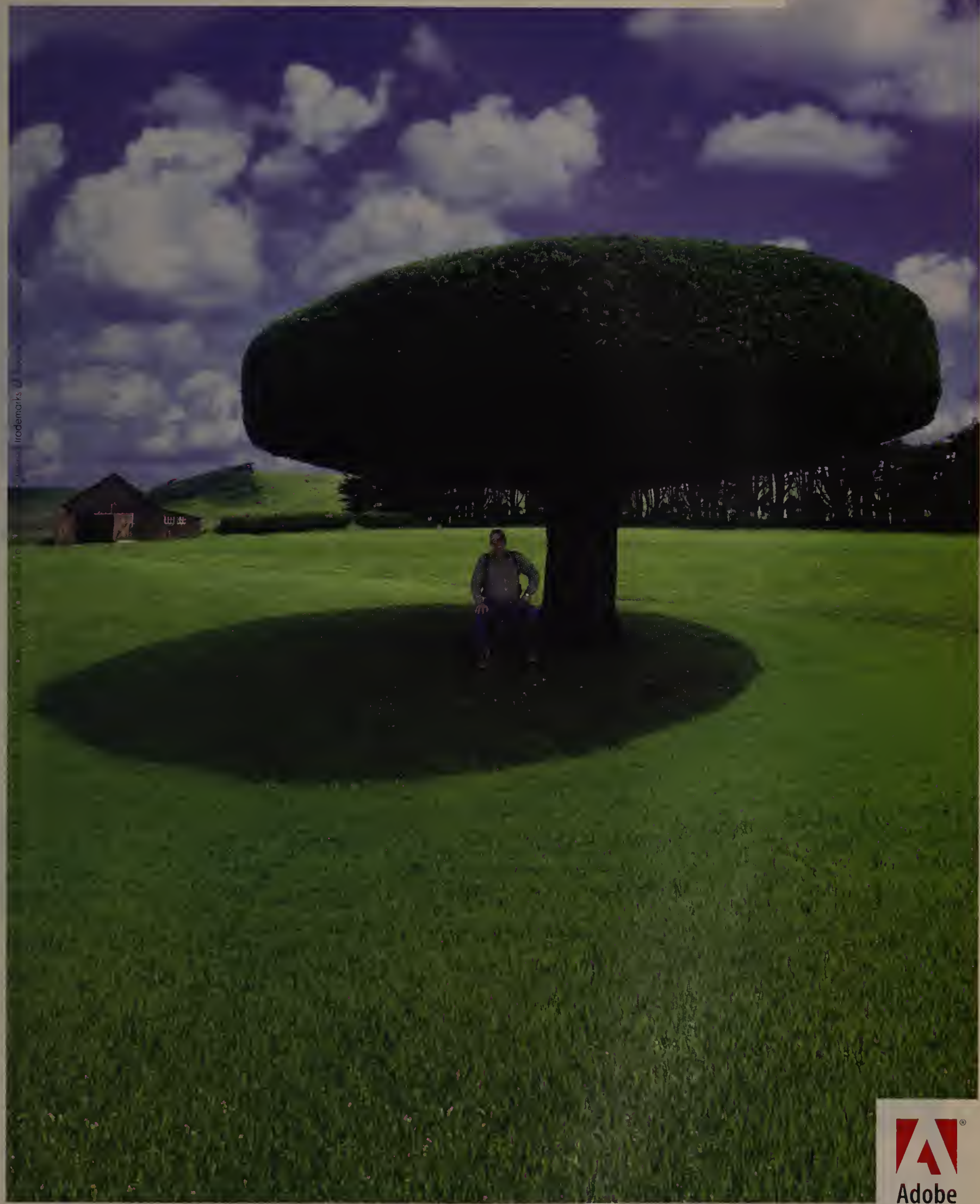

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big audio dynamite

USB Speakers

DIGITAL SPEAKERS comprise an intriguing category of USB peripherals. Digital units give you control over volume and other audio settings through software, allowing more convenient and precise adjustments. Some USB speakers can even stream digital audio over the USB connection—bypassing the sound card's analog audio-out ports. This strategy eliminates signal noise introduced inside the PC's case, enhancing clarity. But you get this feature only with Windows 98—Windows 95 doesn't support it. Also, we couldn't get any of the speakers to play audio CDs under Win 98 (because of a bug in our copy of the beta). Otherwise, setup and operation went perfectly, with no rude surprises even during our unplug-and-replug tests.

USB SPEAKERS: 1. Altec Lansing ADA305, 2. Philips DSS-350, 3. Altec Lansing ADA310.

ALTEC LANSING ADA305 OUR PICK
ALTEC LANSING ADA310

THE ALTEC LANSING ADA305 and ADA310 digital speakers, both compatible with Windows 95, are nearly identical three-speaker sets with two satellite speakers and a subwoofer. Separate front- and side-firing panels on the 10-watt satellite speakers add a spatial aspect to the audio. The effect is most powerful when playing Surround Sound using Dolby's AC3 5.1 (five channels plus subwoofer) digital audio scheme—common on DVD-ROM titles using MPEG-2 video. Audio quality was impressive; we particularly liked using the USB-enabled software to adjust audio channels and settings on screen.

What the $299 ADA310 has that the $199 ADA305 doesn't is a remote control and a built-in decoder for turning streaming AC3 data into audio. The remote can be useful if you want to use the speakers as part of a PC-centric entertainment system, allowing you to adjust the sound from across the room. The decoder adds the theater-quality audio used in DVD titles and movies—great if you have a DVD-ROM drive, but there's no decoder board for processing digital AC3 audio. Since most DVD-ROM kits ship with built-in decoders, though, the lower-priced ADA305 set will be fine for most users. Altec Lansing, 800/258-3288, www.altecmm.com.

READER SERVICE NO. 692

ALTEC LANSING'S USB SPEAKER STUDIO SOFTWARE lets you tweak multichannel audio for maximum effect.

PHILIPS DSS-350

PHILIPS'S DSS-350 speakers are priced at $199, the same as Altec Lansing's ADA305, but they are not as good a buy. While these powerful 30-watt satellite speakers can outmuscle the Altec Lansing units, the DSS-350 set doesn't include a subwoofer to enhance bass audio, as is the case with both the ADA305 and ADA310. Although Philips says that the DSS-350 will offer digital controls when the speaker set ships, such controls were unavailable at the time of our review. In addition, no drivers for Windows 95 were available for testing, though Philips again says that drivers will be provided. Philips Consumer Electronics, 800/835-3506, www.philips.com.

READER SERVICE NO. 693 ▶

USB PRODUCTS	Type	Street price	Additional ports	Powered hub	Windows 95 drivers
Altec Lansing ADA305 [1]	speakers	$199	none	n/a	● [2]
Altec Lansing ADA310	speakers	$299	none	n/a	● [2]
Philips DSS-350	speakers	$199	none	n/a	○

● Yes ○ No n/a = not applicable [1]Our pick. [2]Limited functionality under Windows 95.

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more than a pretty face

Monitors

NO, USB WILL NOT replace the video port on the back of your PC: You'll still need your old 15-pin VGA cable to connect your monitor to your graphics card. But it can rescue you from difficult on-screen menus for adjusting the picture. And a USB monitor can be a hub—a convenient place to plug in other USB peripherals. If it's powered, it can even provide extra electricity to those devices, taking some of the load off your PC. Of the monitors we reviewed, only Compaq's V75 failed to do all of these things.

USB MONITORS: 1. Compaq V75, 2. Samsung SyncMaster 700Up, 3. Philips Brilliance 107.

COMPAQ V75

THE COMPAQ V75 IS an inexpensive 17-inch (16-inch viewable) monitor with an impressive picture. However, it lacks the extras that make most USB monitors attractive. All it really does is put a USB port on your desktop, where it's easier to reach than the ones on the back of your PC.

The V75 won't supplement electrical power on the bus, so you can't use this $529 monitor to extend a USB daisy chain beyond five devices. And the V75 lacks USB controls for adjusting the display.

If you need a cheap, USB-capable monitor, the V75 works fine. But if you need a monitor to serve as a true USB hub, you'd be better off with either the Samsung or the Philips product. Compaq Computer, 800/652-6672, www.compaq.com.

READER SERVICE NO. 694

PHILIPS BRILLIANCE 107 OUR PICK

THE $599 PHILIPS Brilliance 107 makes a terrific case for USB. This affordable 17-inch (15.9-inch viewable) monitor provides great image quality, includes built-in speakers, and offers four powered USB ports. The hub, mounted in an optional bay on the back of the monitor, worked flawlessly with all sorts of device combinations. Best of all, the Windows-based controls are the most extensive we've seen, even letting you adjust speaker settings—though the speakers themselves use traditional analog audio inputs. If you want your next monitor to take advantage of USB, consider the Brilliance 107. Philips Consumer Electronics, 800/835-3506, www.philipsmonitors.com.

READER SERVICE NO. 695

SAMSUNG SYNCMASTER 700UP

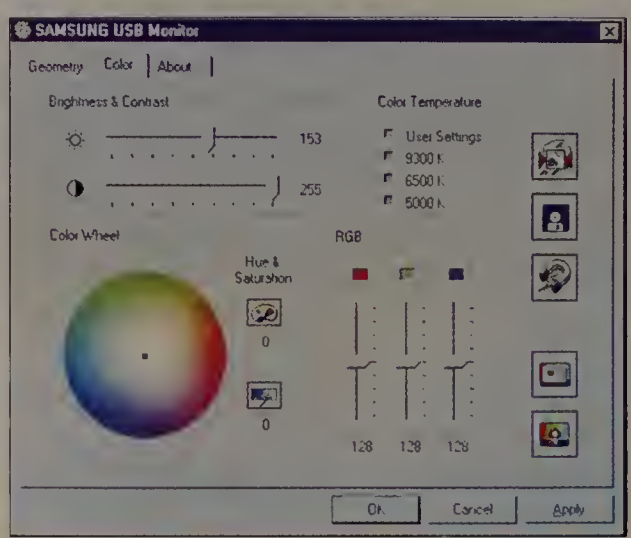
LIKE THE BRILLIANCE 107, the 17-inch (15.8-inch viewable) Samsung SyncMaster 700Up is a high-quality monitor that makes full use of its USB design. It provides three powered USB ports (one less than does the Brilliance 107) in the back of the swivel base, allowing you to extend the number of bus-powered devices running off its USB connectors. The 700Up also offers USB display controls, with an on-screen control panel that lets you adjust the monitor's color and geometry settings. The stylish interface includes nifty graphics for previewing changes, but there are fewer options than on the Philips monitor. Other cons: At $649, the 700Up costs $50 more than the Philips, and it has one less USB port and less-extensive USB controls. Samsung Electronics, 800/933-4110, www.sosimple.com.

READER SERVICE NO. 696

USB PRODUCTS	Type	Street price	Additional ports	Powered hub	Windows 95 drivers
Compaq V75	monitor	$529	1	○	○
Philips Brilliance 107	monitor	$599	4	●	○
Samsung SyncMaster 700Up [1]	monitor	$649	3	●	●

● Yes ○ No n/a = not applicable [1]Our pick.

SAMSUNG'S 700Up tucks a three-port, self-powered USB hub in its base. Better yet, the monitor's innovative control software actually makes it fun to tweak your display settings.



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USB Accessories

CATC ANDROMEDA USB HUB

THE $95 CATC ANDROMEDA USB Hub is an unpowered hub that adds four ports to your USB setup. The only stand-alone hub available in time for our review, this compact device fits neatly on top of a mid-tower PC. Talk about simple: We plugged the hub into our PC's USB port, connected peripherals to the hub, and were done. On a PC with two built-in USB ports, the Andromeda yields a total of five ports (it takes up one itself).

The Andromeda worked with all our peripherals, but we did run afoul of a nasty surprise. Because of how Windows 95 and 98 log USB installations, we had to initialize each of the four ports on the hub twice, doing so once when the hub was connected to one PC port and then again after plugging into the other port. That meant restarting the PC a total of eight times. You'll have to go through this process for each of the eight port configurations, so you might as well initialize them all when you use the hub the first time. This complaint aside, the Andromeda USB Hub adds convenience and flexibility to your existing USB setup. Computer Access Technology Corp., 800/909-2282, www.catc.com.

READER SERVICE NO. 697

CMD CSA-6700

FOR $59, the CMD CSA-6700 USB add-in card will teach your old PC some new USB tricks. This PCI card has two USB ports and includes drivers for Windows 95 and DOS. When we tried using the card with USB, it equaled the USB ports on our test PCs in performance and compatibility.

We installed the CSA-6700 in a DeskStation notebook-expansion chassis, attached and booted a Toshiba Tecra 700 notebook computer, and installed the driver from the installation disk. We successfully connected a variety of USB peripherals, running them directly off the CSA-6700's two USB ports. We also easily attached the Andromeda USB Hub and SyncMaster 700Up monitor (both reviewed here) to the CSA-6700 and branching peripherals off the hub and monitor. The CSA-6700 is an inexpensive way to to take advantage of new USB devices on an older PC. Computer CMD, 800/426-3832, www.cmd.com.

READER SERVICE NO. 698

BELKIN COMPONENTS USB PARALLEL ADAPTER

IF YOU HAVE A USB PC but a non-USB printer, the $59 USB Parallel Adapter by Belkin Components makes it possible to print from your USB port. We plugged the product—a 7-foot cable with a USB connector on one end and a 36-pin female Centronics connector on the other—into a Hewlett-Packard LaserJet 4 Plus printer and got perfect printouts every time.

The Parallel Adapter fools Windows into thinking that the printer is sitting on just another printer port. You'll need to redirect your printer to the LPTUSB1 port. (Run Control Panel, launch the Printers applet, right-click the appropriate printer icon, choose Details, and select the port.) Best of all, you can still use your existing LPT1 parallel port to hook up another peripheral. Belkin Components, 800/223-5546, www.belkin.com.

READER SERVICE NO. 699

USB ACCESSORIES: 1. CATC Andromeda USB Hub, 2. Belkin USB Parallel Adapter, 3. CMD CSA-6700 USB add-in card.

USB PRODUCTS	Type	Street price	Additional ports	Powered hub	Windows 95 drivers
Belkin USB Parallel Adapter	parallel port-to-USB cable	$59	n/a	n/a	●
CATC Andromeda USB Hub	hub	$95	4	○	●
CMD CSA-6700	USB upgrade card	$59	2	○	●

● Yes ○ No n/a = not applicable

David English is a freelance author who has written more than 500 computer-related articles. He is based in Greensboro, North Carolina. Jeff Yablon, who is otherwise known as radio's Answer Guy, is a freelance author and consultant based in Mount Arlington, New Jersey. Michael Desmond is a senior associate editor at PC World.

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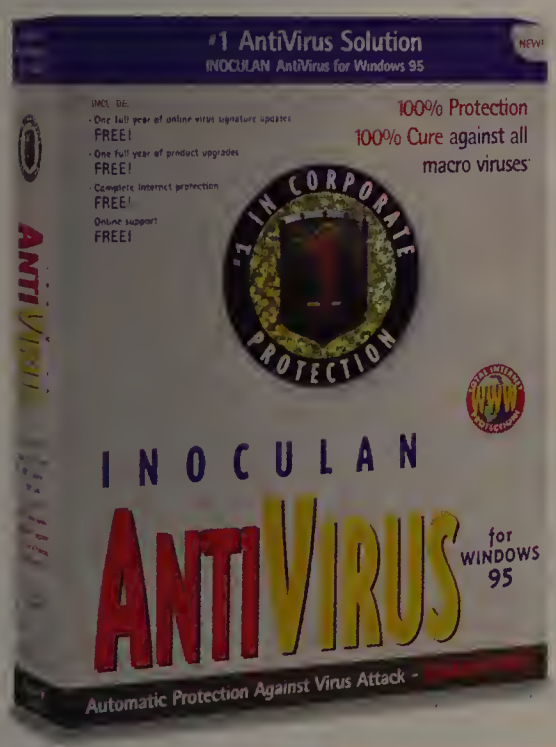

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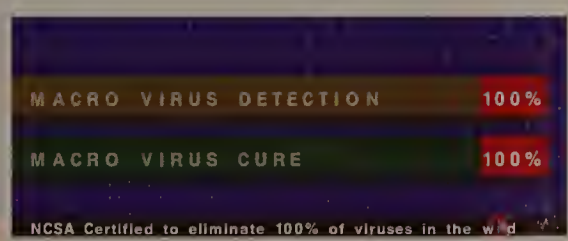

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HP Idea Kits

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What you need:

Mindscape® PrintMaster™ Gold 4.0
HP Premium Heavyweight Inkjet Paper or other stiff paper
Monofilament fishing line or string

❶ Start *PrintMaster Gold* and click *Brand New*, then choose *Poster* and *Tall.*

❷ To spell your baby's name, click on , pull down *File* and highlight *Open From Disk.* If you have the *Let's Celebrate* kit, open Disc 1 and get a colored block from the *Blocks* folder inside the *HP_Art* folder (the blocks are in folders identified by color). Use the black corner "handles" to fit it in the top left quarter of the page.

❸ Then hit *Ctrl-C* to copy it for the back of the mobile, followed by *Ctrl-V* to paste it. Drag the copy to the other side of the page. Repeat this step to put another block and its copy at the bottom of the page.

❹ Continue adding pages of blocks, repeating steps ❷ and ❸ until you've spelled your baby's name. Click and print them on stiff paper.

❺ Start a new page just like in step ❶, only this time make the page *Wide* instead of *Tall.*

❻ Find the *Clouds* folder and double-click on any of the six clouds. Size it to fill the page, leaving a border of about an inch all around. Click on and make a text box on the cloud. Type in words, pick a font and a color. Print it

on stiff paper. Now make a mirror image of the cloud (but not the text). Select the cloud only, pull down the Arrange menu and click *Mirror Left to Right.* Then print it again.

❼ Cut out all your printouts with a craft knife. Don't cut through the outside edge of the paper the cloud is printed on. Instead, cut a border one inch wide around the hole where the clouds were, as in the picture at left.

❽ Sandwich pieces of fishing line or string between the backs and fronts of the clouds, borders and blocks and glue them together so the cloud is suspended inside the border and the blocks hang in a row at the bottom.

❾ For safety, hang the mobile where the baby can't reach it.

Baby Steps

Birth announcements are fun to think up. One of our favorites was for a little boy named Nathan. The card read, "Birth of a Nathan."

The one below is really easy to make. After all, it's not like you have extra time on your hands.

What you need:

Mindscape PrintMaster Gold 4.0
Adobe® PhotoDeluxe™
Avery® Index/Post Cards (#5389™)

❶ Start with a photo of the baby. If you have an HP Pavilion with PhotoDrive, just pop it in and the drive automatically scans it for you. Or take it to a copy shop for a color scan at 150 dpi. Save it as a bitmap (BMP). Or have your photo developed on a Photo CD.

❷ Load it into your computer and start *Adobe PhotoDeluxe.* Click *Guided Activities* and click *Touch Up Photo.*

❸ Next, click and follow the *PhotoDeluxe* steps through *Step 5.* Ignore *Step 6* and click *Done.* Don't get too carried away cropping it. A good head-and-shoulders is what you want.

❹ Got a case of baby red eye? Just click and follow the steps.

❺ Now, pull down the *File* menu and highlight *Export* and *File Formats.* Give the photo a new name, save it as a BMP and close the program.

❻ Start *PrintMaster Gold* and click *Brand New.* Select *Labels.* Scroll down to *5389 Index/Post Card* and click *Finish.*

❼ In the *Project Gallery* window, pull down the *File* menu and click *Open from Disk.* Find the photo of the baby. Double-click to put it on the page. Use the black "handles" to fit it into the top half of the card, leaving at least an inch margin all the way around.

❽ How about a border? Use clipart, or if you have the HP Idea Kit, go to the *File* menu again and find your way to *Let's Celebrate* Disc 1. Open the folder called *HP_Art.* Double-click the images in *Blocks* one at a time to bring them onto the page. Arrange them around the edge of the photo to make a border.

❾ Click and then click underneath the framed picture to make a text box. Type in your text and the baby's vital statistics.

❿ Now, you're ready to print. From the *File* menu, click *Print.* Put some Avery Index/Post Cards in the printer tray and click *OK.*

Life's full of small victories and precious moments. Why not make them all great little celebrations?

Everyday Celebrations

Someone in the family kick a winning goal? Congratulate the sports superstar with some special decorations. Let's start with a place mat.

What you need:

Adobe® PhotoDeluxe™
Mindscape PrintMaster Gold 4.0
HP Bright White Inkjet Paper

❶ Choose or take a photo and follow the directions in step ❶ on page 2 to make it into a computer file.

❷ Start *Adobe PhotoDeluxe*, click *Guided Activities*, *Transform Photo*, *Collage* and . Follow the instructions through *PhotoDeluxe Step 3* to give your photo a white background. Click *Done*, *Main*, *On Your Own* and *Modify*. If you have trouble with unwanted white pixels, see step ❹ on page 6 to fix it.

❸ For more white background all around, click the *Size* tab, followed by . Type in the new width and height.

❹ On the left of your screen is a folder that says *Select*. In the box below it, scroll down to *Color Wand* and click in the white space.

❺ Click on the *Effects* tab, followed by the *Gradient Fill* button. Select a *Start Color* and an *End Color*. Click the *Selection* button and the *Circular-In* button. Then click *OK*.

❻ Go to *File*, *Export* and *File Formats*. Name the photo and save it as a bitmap (BMP).

❼ Now, start *PrintMaster Gold*, click *Brand New*, followed by *Poster* and *Wide*.

❽ Click , pull down *File* to highlight *Open from Disk*, find your photo, double-click it and use the black "handles" to size it.

❾ Now, a headline. Click and type your text. Click to color it, to color the lines, to add a drop shadow and to color the shadow.

❿ Add a starburst around it. Click , then *More*. Scroll down to *Burst 4* and click *OK*. Hold down the mouse button and drag a starburst over the headline. Click and choose a complementary color. Click *Layer* in the *Arrange* menu and then *Send to Back*.

⓫ To keep the place mat (the first of many, maybe?), laminate it at a copy shop or sandwich it between sheets of clear contact paper.

A Banner Day

Say it big with a banner. Use HP Banner Paper or use 8.5" x 11" sheets joined together. Trim the edges for a blue background with no white border.

What you need:
Mindscape PrintMaster Gold 4.0
HP Banner Paper or 8.5" x 11" paper

❶ Start *PrintMaster Gold*, then click *Brand New*, followed by *Banner* and *Finish.*

❷ You'll see a single page. Click ▭, then click in the upper left corner and drag to the right to add all the pages you need. Drag the box by the black "handles" until it covers the layout. To give it a color, click ⬙.

❸ Click T, make a box the length of the banner and type your message. Click T to make the type fit into the text box. Pick a typeface, a color and keep going.

❹ How about some cool shapes? Click ☆ and click and drag to make a shape the size you want. Color it, put lines around it, have fun!

❺ Add a picture. Click 🖼 and then *Open from Disk* in the *File* menu. Navigate to the picture you want, and double-click on it.

❻ Now, click *Print* in the *File* menu. In the print window, click *Output Size* to see how many sheets you need. Click *Setup.* In that box, click *Options.* In the next box, click *Paper.* Under *Paper Options*, click *Banner.* Click *OK* to close those boxes. Put as many sheets of HP Banner Paper as you need, plus one extra, in the printer tray and raise the banner support. Hit *Print* and it's a banner occasion.

Pretty as a Picture

In the HP Idea Kit, you'll find a file called FRAME on Disc 1. Open it, add a picture and decorate it with fun clipart. Then print it on HP Photo Paper. It'll even stand up by itself.

How quickly they grow. One day they're in diapers, the next day they're borrowing the car to go to a graduation party. It's a time for celebration. And an opportunity to give your child a time capsule of his life so far. It's a gift he'll cherish for years to come.

Photo Time Capsule

What you need:

Adobe® PhotoDeluxe™
Mindscape PrintMaster Gold 4.0
HP Bright White Inkjet Paper or any 8.5" x 11" paper

1. The first step is to collect memorabilia from his babyhood. Our time capsule has his first pair of shoes, a toy car and a photo of his cute little drooling face. Then collect the equivalent things from now. We used his basketball shoes, car keys and a sports photo.

2. If you have a scanner, scan the items directly (at 150 dpi) or scan photos of them. Or have the photos developed onto a Photo CD. When you save them to your computer, put them all in the *Hold* folder in *PhotoDeluxe*.

3. Open *PhotoDeluxe*, click *Main*, then *On Your Own* and *Modify*. Click *Hold Photo* and start working on your photos one at a time.

4. Click the *Tools* tab and then . Erase the background around each object and then save it again. If you're using an MMX-enhanced Intel Pentium processor and you're having trouble with unwanted white pixels, you'll need to download an updated plug-in file from the Adobe Web site (http://www.adobe.com). First exit the program, go to the *PhotoDeluxe* plug-in folder and change the name of the file called *FastCore.8bx* to *FastCore.old*. Then download the new plug-in file, *Fast.exe*, into the Adobe plug-in folder using the Web site directions.

5. Now open a new page. Pull down the *File* menu and click *New*. Set the size to 8.5" x 11" and the resolution to 150. Click *OK*.

6. Go to the *Layers* window and double-click *Layer 1*. Rename it *Background*. Click and choose a light color. Click anywhere on the page and it will fill with the color.

7. Open *Hold Photo* and select a photo of the baby shoes. Make a new layer and call it *Shoes*. *PhotoDeluxe* only lets you put one photo at a time on a layer from *Hold Photo*, but you can open another photo from the *File* menu, copy it and then paste it onto the same layer. Do this for each pair of objects. (You'll end up with four layers.) When you're happy with the arrangement, pull down the *File* menu, go to *Export*, then *File Formats* and save the file as a bitmap (BMP). Close *PhotoDeluxe*.

8. Start *PrintMaster Gold*. Click *Brand New*, *Poster* and *Tall*. From the *Add* menu, click *Object* and *Create From File*. Type in the file name and click *OK*.

9. How about a headline? Click on . Type in your headline, pick a font and a color. Add type effects by clicking , , and .

10. Now, to print. Click and, in the print window, click *Output Size*. Set *Inches Wide* to 14, and click *OK*. For really sharp results (if you have an HP 690 or 700 series DeskJet printer), pop in your HP photo cartridge and print on HP Premium Photo Paper. Either way, your time capsule will print on four sheets you can paste onto stiff board and frame.

Home Is Where the Washer/Dryer Is

If your graduate is going away to school, make up a booklet of coupons that are redeemable on weekend trips home. Open *PrintMaster Gold*, then click on *Brand New* and *Brochure*. Click on *Wide* and set *Panels* to *4*. Put a coupon on each panel, print them, cut them apart and staple them together.

Weddings should be special, the stuff that memories are made of, down to the very last detail. With that in mind, we give you these projects. If you already have the HP Idea Kit, use our clipart on *Let's Celebrate* Disc 1. Otherwise, choose some special clipart from *PrintMaster Gold.*

Stunning Invitations

Very stylish invitations can be made with two layers: vellum, a kind of translucent paper, for the top layer and a good quality ivory paper for the inside. (Pick up 8.5" x 11" sheets of vellum, or have them cut to size, at an art supply or specialty paper store.)

What you need:

Mindscape PrintMaster Gold 4.0
Vellum sheets (8.5" x 11")
Avery® Embossed Half-Fold Cards (#3260™)

❶ Start *PrintMaster Gold*, click *Brand New, Half-fold Card, Tall* and *Finish.*

❷ For the front cover of the vellum layer, pull down the *File* menu and highlight *Import.* Navigate to the *HP_Art* folder, open *Wedding* and double-click INVITELN.BMP. Size it using the black "handles" to fill the front of the card, leaving space in the middle for your text.

❸ Click T and make a text box. Pull down the text menu and click *Wedding* or *Majestic.* Type in the details.

❹ With the type selected, pull down the *Format* menu and click *Paragraph.* Set the Line Spacing to 1.5. You may need to adjust the size of the type to make it fit easily into the space. Pull down the size menu (next to the text menu) and find the size that works best.

❺ Save the file and click . In the print window, click *Outside Only* in the *Print Range* box. De-select *Print Instruction Page* by clicking in the box to make the check mark go away. Set the number of copies you need and put in a

stack of vellum sheets. Click *OK*. Close the *PrintMaster* file.

❻ Open a new *PrintMaster* file by clicking *Brand New*, *Half-fold Card*, *Tall* and *Finish*. Click and, from the *File* menu, pull down and highlight *Import*. Go to *Wedding* in the *HP_Art* folder, and double-click INVITEFL.BMP. Size it to cover the page using the black "handles."

❼ Click to go to the inside of the card. Use the inside for the day's agenda or menu or directions to the ceremony and reception. Follow steps ❸ and ❹ to type in the text.

❽ Now, you're ready to print again. Click *Print* and, in the *Print Range*, click *Both Sides*. De-select *Print Instruction Page* by clicking in the box to make the check mark go away.

❾ Set the number of pages and put ivory paper, such as Avery® Embossed Half-Fold Cards, into the printer tray. Click *OK*.

❿ While they're printing, fold all the vellum sheets in half. Then fold the insides in half and put the two together. We now pronounce the invitation complete. And don't forget the envelopes. To print a wedding image on the front of your envelopes, use a watercolor from the Weddings folder in the *HP_Art* folder on Disc 1.

TIP: Print RSVP cards on Avery Personal Creations™ Mini Folded Cards (#3264™) and slip them inside the invitations.

A Thank You to Remember

They're right behind you all the way down the aisle – your family and friends, all the people sharing the most important day of your life. Make them feel special, too, with a handmade thank-you note. Look for our special borders in the *Wedding* folder on Disc 1.

What you need:

Mindscape PrintMaster Gold 4.0
Avery® Embossed Ink Jet Note Cards (#3259™)
or Avery® Ink Jet Note Cards (#8315™)

❶ Open *PrintMaster Gold*, click *Brand New*, *Note Card*, *Wide* orientation and *Top* fold. Click *Finish*.

❷ Click to make a text box. Position it in the middle of the front of the card. Type "Thank You, Aunt Jean" (or whomever). Click the little arrow in the bottom left corner to go to the inside of the card and make another text box for your personal message.

❸ Place a note card in the printer tray and click *Print*. De-select *Print Instruction Page*. Click *OK*. When it has printed, take it out of the printer and, keeping it face up without turning it, put it right back in the printer tray. Click *OK* to print the inside and finish the job.

The years go by and each one is marked by a very important day: your anniversary. It's always an important milestone and a great reason to celebrate. So take these projects and go have fun.

For a Big Day, a Big Card

How long have you been married? Really? That long? This calls for a card. A really big card.

What you need:

Mindscape PrintMaster Gold 4.0
HP Bright White Inkjet Paper
Poster Board (at least 15" x 20")

❶ Start *PrintMaster Gold* and click *Brand New*, followed by *Poster*, *Tall* and *Finish*.

❷ Let's start with a festive background. Click on and type the words "A Quaint Place" in the *Keywords* box. Click *Find Now*. Double-click on the image and size it with the black "handles" so it fills the page.

❸ Now, copy it by pulling down the *Edit* menu and clicking *Copy*. Pull down the *Edit* menu again and click *Paste* to place the copy right over the top of the the first one. Size the copy to make it about an inch smaller all around than the one underneath.

❹ Click and *More*. On the right side of the window is a gray scale. Run the pointer up to mid-gray. Click *OK*.

❺ Add some text by clicking and then clicking on the card to make a text box. Select a typeface in a large size and write your message. Make the text a color by highlighting it and clicking . Choose a color and click *OK*.

❻ Now print it. Click and, when the print window comes up, click on *Output Size*. Set *Inches Wide* to 14, then click *OK*. It will print in four pieces. Trim them with a craft knife and glue them to stiff poster board.

❼ Ours is a single-sided card, but you could make it into a regular giant greeting card by making an inside. Just follow these instructions again, but because this is the inside, put in a different message and maybe a photo of the happy couple (see steps ❶ to ❺ on page 2).

❽ Print the inside and glue it the same way as you glued the outside in step ❻. Tape the two pieces together down the left-hand edge using heavy duty tape.

Seven Unforgettable Ideas

What you need:

Mindscape PrintMaster Gold 4.0
HP Bright White Inkjet Paper

Anniversary clock face. "The finest time I ever spent was the time I spent with you." Buy a clock you can decorate, put a favorite photo on the face and watch as time goes by.

Photo collage. Why not mark your anniversary with a photo collage? Gather together every photo you can find – first date, wedding, honeymoon, baby showers, trips you took, sweet moments, embarrassing moments. Make scans of them, then follow the steps under the heading *Photo Time Capsule* on page 6.

Commemorative champagne labels. Commemorate a 50th anniversary with your own champagne label. Print the toast on an Avery Ink Jet Label and put it on the bottle.

Personalized stationery. Scan your loved one's signature and print it at the top of twenty sheets of a very good quality paper. Buy envelopes to match and you have the perfect paper anniversary gift.

Travel itinerary. Planning a surprise trip for your anniversary? Print the itinerary, including restaurants, hotels, sights and shows, and give it to your loved one as you board the plane.

Wrapping paper. Scan in your marriage certificate or wedding photo, reduce it and print it all over sheets of HP Bright White Inkjet Paper. Use it to wrap the anniversary gift you're giving.

Chocolate box inserts. Replace the vellum sheet that's usually in the top of a box of chocolates with your sweet version. Buy vellum sheets from an art supply or specialty paper store. Then print one with your own special message for each candy.

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5966-2205EUS

Software update services promise to make your PC bug-free. Don't believe the hype.

NoEasyFixes

ONCE UPON A TIME, only two things were inevitable—death and taxes. Today a third specter has come to haunt us: buggy software.

It's not just the upstarts and also-rans that suffer. I'm talking about flagship products from some of the biggest developers on the planet. Microsoft's Internet Explorer 4.0 and Symantec's Norton Utilities 3.0 both ▶

BY SCOTT SPANBAUER

ILLUSTRATIONS BY HENRIK DRESCHER

debuted with multiple showstopping bugs. Netscape Communicator is already on version 4.05 and counting. Microsoft Office 97 needed a 7MB service pack. Corel WordPerfect Suite 8 has reached service pack number 3. And Windows 98's primary appeal is that it will incorporate all of the fixes accumulated in the last three years.

As author of *PC World*'s monthly *Bugs and Fixes* column, I've seen more bugs than the Orkin man. And as more and more software companies go with the "ship now, fix later" model, the situation's only going to worsen. Fortunately, many software and hardware vendors are diligent about regularly patching and updating their apps and drivers. The trick is to find the fixes before the bugs find you.

I've seen more BUGS than the ORKIN man.

CHECK THE OIL AND THE .DLLS

KEEPING YOUR software up-to-date is a job for Dionne Warwick and her psychic friends. First, you must somehow sense that a patch is available for one of the 837 products installed on your system. Then, while you're in the shower, you'll have a vision revealing the exact URL that you need—better keep a waterproof marker handy. Finally, armed with this miraculous newfound knowledge, you have to spend the better part of a day downloading the 10MB patch and installing it (don't forget to disable call waiting).

There's got to be a better way—and at least in theory, there is: *automatic update services.* These applications promise to deliver the latest bug fixes, drivers, and program upgrades for practically anything installed on your system.

Sound like a great idea? I thought so, too. So I tried five of the services on my PC: Manageable's Catch-Up, Symantec's LiveUpdate Pro, CyberMedia's Oil Change, Quarterdeck's TuneUp, and GreenTree's Update AnyWare.

All of these services combine a Web site with software that runs locally on your computer. The local program first scans your hard disk for installed applications and then compares the results with an online database of known fixes available for download.

Some services allow you to schedule downloads for a time when you're away from the computer, and they can also install updates for you automatically. A few even help you uninstall updates that turn out to be more trouble than the prob-

Five Ways to Kill

SOMETIMES the best way to avoid catching a nasty bug is to take matters into your own hands. Although I can't guarantee that you'll be totally bug-free, here's where to start.

1 Back Up...or Else! As the Buddhists say, "Death comes without warning." Before some nasty bug takes your data to the great beyond, copy those crucial files, messages, and address books to floppies or to the network. Do it now, before your word processor has another grand mal seizure. Don't make me come over there.

2 Check the Web. If there's a patch or driver update for a product you use, it's probably

Software Update Utilities Have a Long Way to Go

All five services we tested missed updates that have been available for months. This chart lists only 17 of the 31 available updates we looked for (for complete results and methodology, see www.pcworld.com/may98/update).

Available bug fixes (as of 1/26/98)	Adobe Acrobat Reader 3.01	Adobe Pagemaker 6.52	Broderbund Riven 1.02	Canon Bubble-Jet BJC-4000 3.92B driver	Corel WordPerfect 7.0.2.41	Creative Labs Graphics Blaster 3D 1.07 driver	HP LaserJet 5P 1.30 driver
Catch-Up	●	○	●	○	○	●	○
LiveUpdate Pro	○	○	○	●	○	○	○
Oil Change	◒	●	●	○	◒	●	○
TuneUp	○	○	○	○	○	●	○
Update AnyWare	○	○	○	○	○	○	●

● = Product offered the fix for download. ◒ = Didn't find the fix but offered other enhancements. ○ = Offered no updates.

hiding somewhere on the company's Web site. But where? Start at the company's home page (usually www.*company*.com), then look for links to technical support, driver updates, software downloads, or the actual product's own home page. If you don't find what you are looking for that way, try looking for a company ftp site (usually ftp.*company*.com). Once you find it, explore it as you would your hard disk's directory structure—hopefully you will come across a downloadable patch.

Bugs Dead

3 Keep a Copy. The only thing worse than downloading a 7MB patch is having to do it twice. After you install a patch, copy it to a floppy or to another hard disk or partition—just in case you have to reformat your C: drive. For big files, use an archive utility, like WinZip 6.3, that allows you to span backups over multiple floppies. Even better, call the company and request a copy of the patch on floppies or CD. They owe it to you.

4 Get the Gossip. I used to advise people to wait for version *x*.01. Make that version *x*.07 these days. Fortunately, zillions of eager users are willing to stand in as guinea pigs for you. Before you buy, check Web-based support forums, mailing lists, and Usenet newsgroups for the scuttlebutt. And of course, call the product's tech support line (if you can afford it). Though technicians are often ingenious practitioners of the art of denial, occasionally you'll find one who's willing to confess.

5 Read Me. Check out *PC World's Bugs and Fixes* column. Besides keeping me gainfully employed, this column reports updates to widely used programs as soon as the fixes appear. Sometimes sooner.

lems they're supposed to fix. The price for all of this convenience? Although Catch-Up is free, most of the services charge between $30 and $40 a year.

To test the five automatic update services, I installed two dozen applications and peripherals on a Cyrix 6x86–based PC. My test bed included Windows 95, Corel WordPerfect, Lotus SmartSuite and Microsoft Office 97, Netscape Communicator 4.04 and Microsoft Internet Explorer 4.01, antivirus and system utilities, device drivers for Hewlett Packard and Epson printers and U.S. Robotics modems, and a lot more. First I backed up the system using PowerQuest's Drive Image, then I ran each update utility through its paces. To ensure a fair footrace, I restored the original contents of the drive before testing each of the products.

The results? Well, let's just say that none of these services is likely to put me out of a job anytime soon.

NOT AT YOUR SERVICE

IN MY REAL-WORLD TESTS, no single update service passed muster. Though most services offer a nice user interface and handy customization and automation features, none delivered enough fixes. In fact, you'd find more patches simply by skimming last year's crop of *Bugs and Fixes* columns.

Oil Change did the best job of the bunch and offers the most installation options. But it still found only 11 of the 31 possible updates—and missed several big ones. For $40 a year, you deserve better. Quarterdeck's TuneUp costs just as much, but offers fewer conveniences and yielded a laughably small harvest of fixes. LiveUpdate Pro runs neck and neck with Oil Change in number and quality of automation features but doesn't match its performance, and Update AnyWare is even more spartan.

But I do heartily recommend Manageable Software's free Catch-Up. Though it concentrates on freeware and shareware programs, it did catch a few commercial utilities, and it found more updates for my test system than any service except Oil Change. Even if you update your system manually, Catch-Up can help. What's Catch-Up's catch? As with many other free Web sites, you'll have to endure an occasional banner ad.

These services need to make their bug-fix databases a lot more inclusive and up-to-date before I can recommend spending money on them. But if you decide to sign up anyway, you'll want to combine several update strategies for best results, including using some of your own elbow grease (see "Five Ways to Kill Bugs Dead").

I NEED A FIX CUZ I'M GOING DOWN

REGARDLESS OF HOW you find your updates—whether through the program's own update command, via a third-party service, or by following your nose—you're still at the mercy of software makers' incli- ▶

Lotus 1-2-3 97 update	Lotus Freelance Graphics 97 update	Lotus Approach 97 update	Lotus Word Pro 97 update	Microsoft Excel 97 recalculation patch	Microsoft Internet Explorer 4.01	Microsoft Office 97 Service Release 1	Netscape Communicator 4.04	Norton Antivirus 2.01	Norton Utilities 3.0 LiveUpdate patch 2
○	○	○	○	○	●	○	●	○	○
●	○	○	○	◒	○	●	○	○	○
◒	○	○	●	◒	●	○	●	●	○
○	○	○	●	○	◒	●	○	○	○
○	○	○	○	○	●	●	●	●	○

WHEN CONSIDERING
BE SURE TO READ

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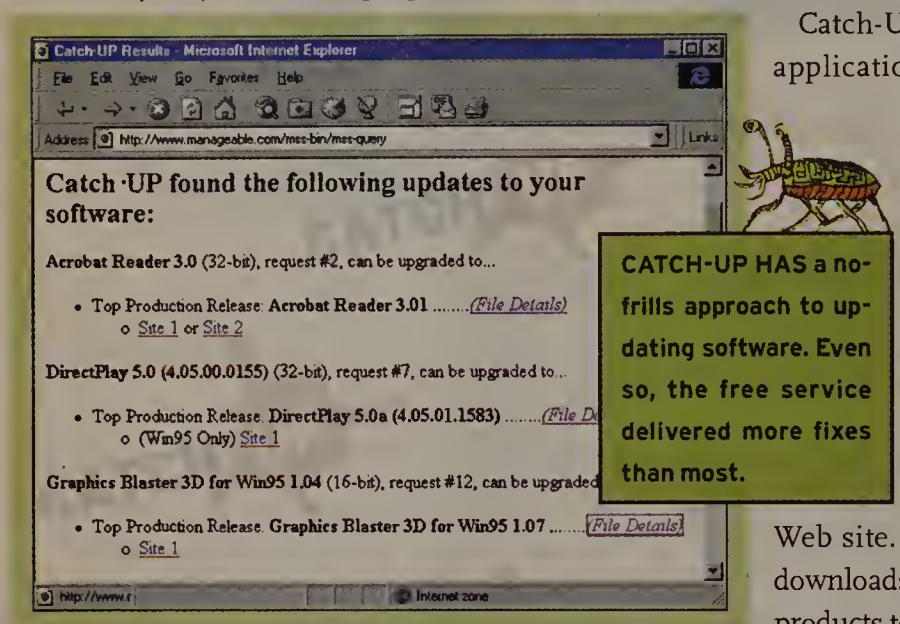
MMX™ intel inside pentium® II PROCESSOR

nation to identify and fix their programs' problems. And if past is prologue, we're in for an increasingly buggy future.

Will we all eventually give up and just learn to love our buggy software? I hope that's not the case, but until the developers make some fundamental changes in the way they write their programs, you're on your own (see "The Bug Stops Here").

My advice: Make frequent backups and save, save, save. If that's just not good enough, complain. When it comes to patches, the more customers who gripe at tech support about a particular bug, the more likely the developer is to do something about it. And when satisfaction eludes you, don't be afraid to vote with your wallet. Return that buggy product and replace it with one that's stable—even if it doesn't floss your teeth, program the VCR, or call your mom.



CATCH-UP HAS a no-frills approach to updating software. Even so, the free service delivered more fixes than most.

Catch-Up

The Price Is Right

Manageable's no-frills service doesn't purport to upgrade most commercial applications, so I wasn't surprised that it ignored my office suites and graphics applications. Catch-Up also lacks the update-automation amenities that its costlier competitors offer. But what it does do—update Internet-oriented shareware and freeware (such as Web browsers and browser plug-ins) plus a handful of commercial programs—it does very well.

If you exclude the big commercial programs in my test suite, Catch-Up found almost every available update, missing only printer drivers. And only Oil Change found more bug fixes than Catch-Up, thanks no doubt to Manageable's twice-weekly update of its online database. It's the perfect complement to the other reviewed services, and I recommend you use it by itself, too, because hey—it's free. It's also the only product I looked at that supports Windows 3.1.

Catch-Up runs as a helper application that works with Navigator, Internet Explorer, or your America Online browser. After you have downloaded the 800KB plug-in and installed it, you simply click a *Catch Up Now* link on the company's Web site. The software then downloads a list of supported products to your PC and scans your system in seconds. Catch-Up offers a unique scanning option geared to Windows 3.1-to-95 upgraders: Instead of having it look for newer versions of whatever it finds on your system, you can tell Catch-Up to focus on updating your 16-bit Internet shareware to 32-bit versions.

Even without providing scheduled downloads, automatic installation, and uninstall features, Manageable's got the right idea for an update service: Deliver as many updates as you can. The company says it plans to support more mainstream programs in the future. If it updates commercial software as well as it tracks the free stuff, I'd probably even pay to use it—and I'm cheap. *Catch-Up, free, Manageable Software, www.manageable.com*

LiveUpdate Pro

Where's the Beef?

This service from Windows-utility heavyweight Symantec initially looks like a strong contender. Unfortunately, behind the buffed facade lurks a 97-pound weakling. Only TuneUp found fewer updates than LiveUpdate Pro. It couldn't hurt, but it won't help much, either.

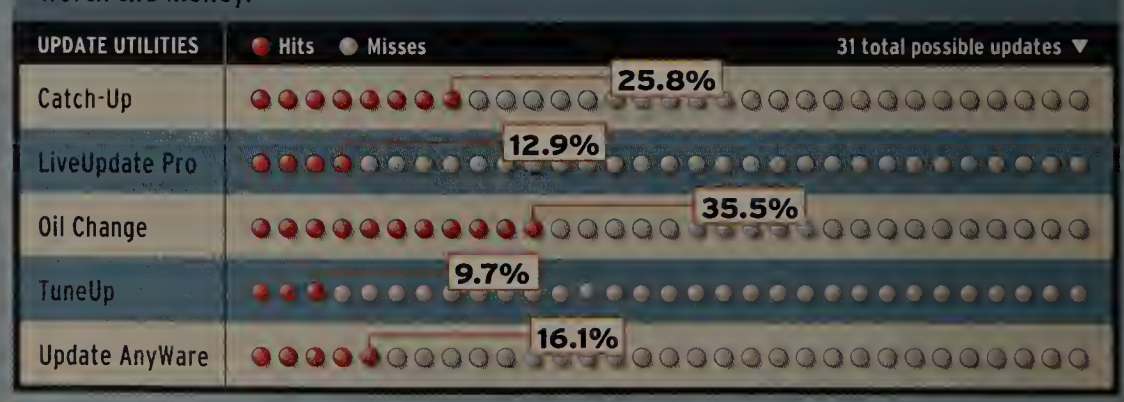
My first experience with LiveUpdate Pro wasn't encouraging: The site was down for several days (for maintenance, according to Symantec). Once it was up again, I downloaded the 2.3MB LiveUpdate program (which took about 15 minutes), installed it, and returned to the Web site to scan for updates (a process that dragged on for another 15 minutes).

I did like the LiveUpdate Pro interface, which organizes updates into Software, Hardware Drivers, and Freeware/Shareware categories. Though LiveUpdate does not let you schedule fixes for later download, you can download multiple updates in a batch, so at least you can go get some lunch while it does its work. And a setting page gives you the option of deleting downloads as soon as they're installed, deleting them after a certain number of days, or keeping them forever just in case.

If only the service had managed to find more of them. LiveUpdate Pro product manager Scott Madden explained the dearth of fixes this way: Symantec ▶

Update Software Misses the Mark

The best of the bunch, Oil Change, found only 11 of 31 possible updates. Until manufacturers improve the database of available patches, update services aren't worth the money.



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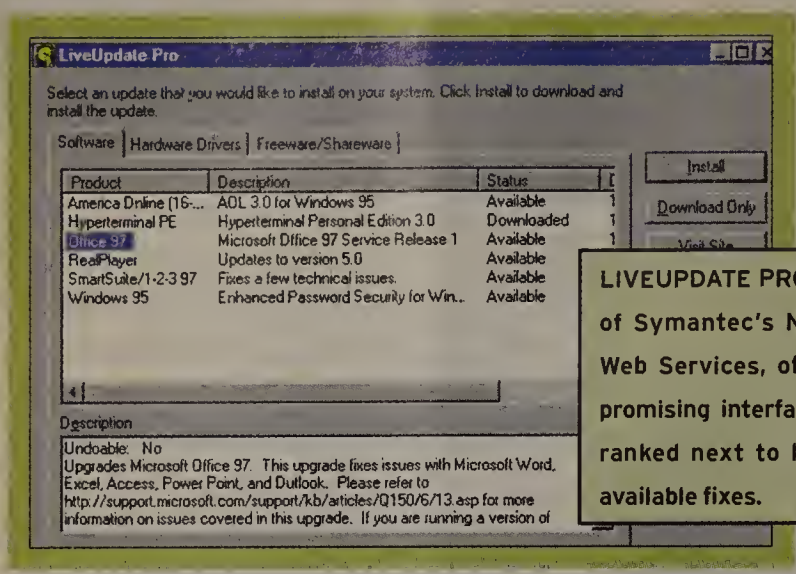


LIVEUPDATE PRO, part of Symantec's Norton Web Services, offers a promising interface but ranked next to last in available fixes.

focuses on fixes that business customers need most, and the company tests each patch extensively before adding it to LiveUpdate Pro's database. That doesn't explain why it missed patches for two Symantec products, however.

Still, you may want to give the service a free trial run. If you purchased a copy of either Norton Utilities 3.0 or CrashGuard Deluxe, you're entitled to use LiveUpdate Pro free for six months. (The coupon with the trial serial number is inside the box—you didn't throw it away, did you?) Madden hinted that additional services are coming soon. *LiveUpdate Pro, $29.95 per year, Symantec, www.nortonweb.com*

Oil Change

Slick but Only Semismart

CyberMedia's updater has been around the longest (since November 1996), and its experience shows. It's the service that allows you to schedule unattended downloads, install them automatically, and later uninstall them (the latter is a helpful feature if the update turns out to contain serious bugs of its own). And Oil Change offered far more fixes for my installed software and hardware than any of the other services I tested.

But if you ask me, the best still isn't good enough. Of the 31 known bug fixes available for my suite of test products, Oil Change found slightly more than a ▶

The Bug Stops Here

EVERYBODY talks about creating bug-free products, but hardly anybody does anything about it. We've gotten so used to buggy software, we've adjusted our work habits to compensate: Save early, save often, and reboot on the hour.

But the future holds two faint glimmers of hope: software that can fix itself, and software that needs less fixing in the first place.

SOFTWARE, HEAL THYSELF

SELF-UPDATING software isn't new: Norton AntiVirus, Quicken, and TurboTax already let users get the latest virus databases, interest rates, and tax codes. And Windows 98 and NT 5.0 will ship with an Update feature that puts fixes at your fingertips.

Microsoft is working on something even better: applications that fix themselves. "When an error message comes up, Windows will read it and automatically download the necessary driver update," says Diana Murray, Microsoft's director of product improvement support technology. If giving Microsoft unfettered access to your PC makes you nervous, Murray says, you can opt to be notified when an update is available. Microsoft is building foundations of the new technology into Windows 98, but full implementation remains years away.

Of course, the company still has to post a fix. For example, Microsoft has no plans to release a Windows NT 4.0 Service Pack 4, despite the dozens of *hotfixes*—post-Service Pack 3 patches still being tested—on its ftp server. Instead, its programmers are all busy trying to crank out NT 5.0.

FREE—AND BUG FREE

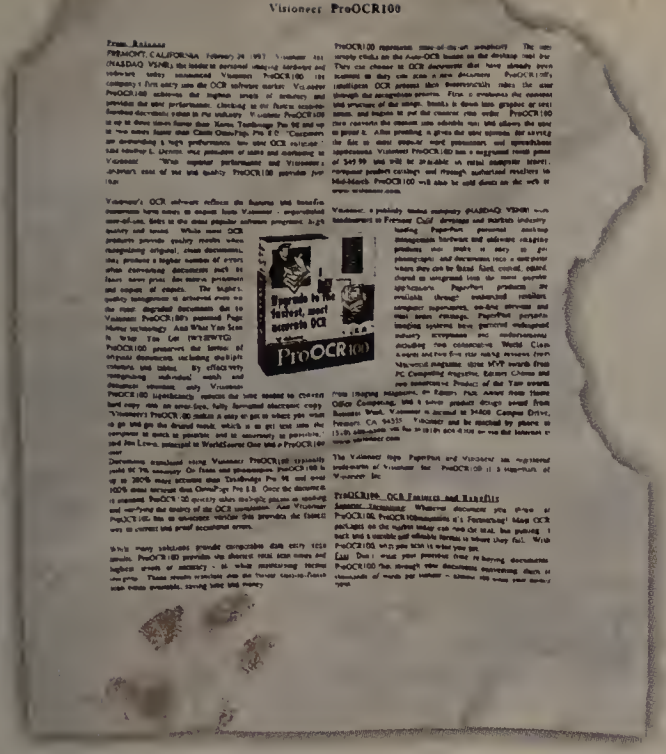
THE PRESSURE to produce new products—and profits—leaves companies with little time or incentive to ensure that current ones work as promised. But this too might change.

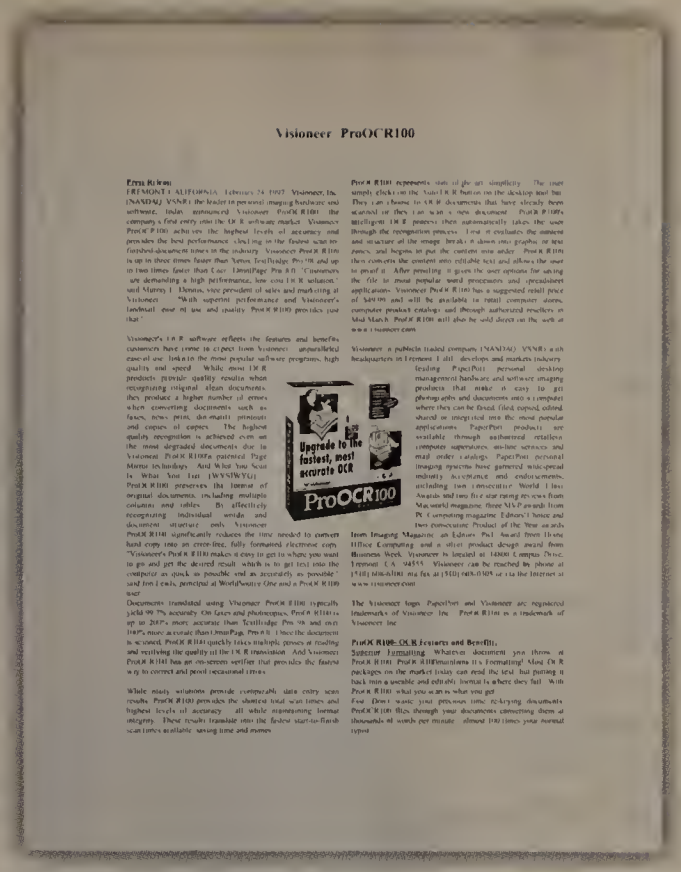
Last January Netscape announced that its upcoming Navigator 5.0 browser will be free to anybody who wants it—and so will the program's source code. Anyone will be able to borrow from the code or add to it, and (most important) fix any bugs they discover.

This model has worked well with freeware apps, such as the increasingly popular Linux operating system. But can companies like Netscape embrace the model and survive?

"If Netscape regains substantial market share through this move, it may set off a long-overdue revolution in the computer industry," says Eric Raymond, author of a 1997 paper on open-source development that inspired Netscape's action. That doesn't mean he expects that all companies will make their code public. "I don't think Microsoft will budge," he says, "but that doesn't bother me, because I think the companies that do adopt this model will beat Microsoft in the marketplace."

If Netscape and others can show that open-source software is more reliable and less costly, Raymond suggests, the nature of the software business will change. "Big customers will demand open source," he says, "...because they'll come to regard independent peer review as the most important guarantee of quality."





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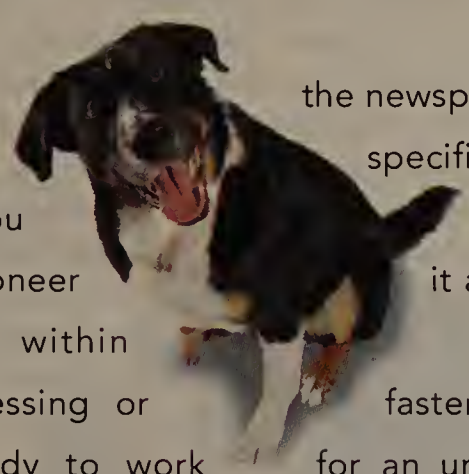

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For $40 A YEAR, TuneUp offers almost nothing but frustration.

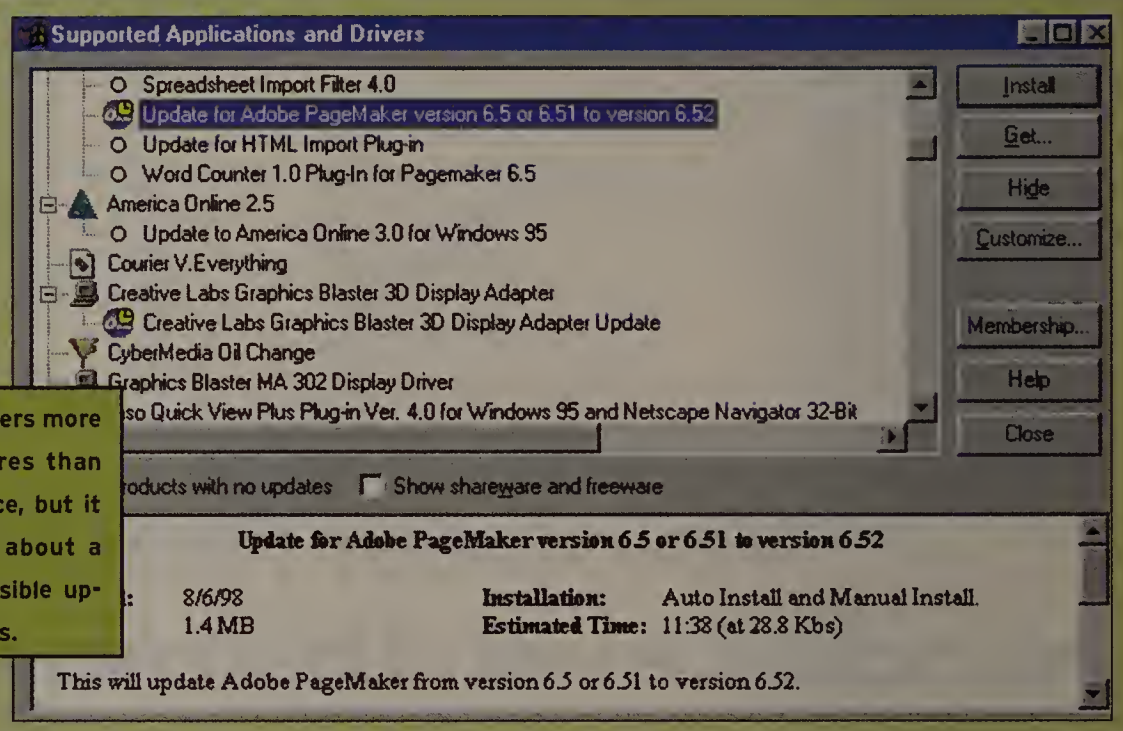
third. Notable gaps in its knowledge included a WordPerfect Suite 7 patch that was released last October, an even older Lotus 1-2-3 97 update, and—unforgivably—the Microsoft Office 97 Service Release 1 patch.

Like all the reviewed services, Oil Change comes with minimal documentation (there's not much need for any), and you can purchase and download the software directly from CyberMedia's Web site. It's a 3.1MB file, so grab a snack and be prepared for a 25-minute download over a 28.8-kilobits-per-second modem connection. After you install the software and register with the service, all you have to do is click the client software's big *Start* button, and you're off. If you bought the product at a store, the first thing it will probably do is update itself: The 1.5MB patch I needed took about 10 minutes to download and install on my system.

Next, it will spend a couple of minutes scanning for installed products and retrieving information about which updates are available from the Oil Change server. To retrieve an individual update, you select it from the list of found products, click the *Get* button, and tell the resulting dialog box whether to grab it right away or at a scheduled time. You can't select a group of updates and then schedule them as a group download, however; it's strictly one patch at a time. Whenever you launch Oil Change, it displays a list of all the updates that you've downloaded but not yet installed, and conveniently offers to install them for you.

You can also set up Oil Change to scan your hard disk automatically in the background and dial in to CyberMedia's server hourly, daily, weekly, biweekly, or monthly for new update databases. And Oil Change will automatically find and download updates for the programs you ask it to monitor.

These features and Oil Change's other unique automation and configuration options put it well ahead of the competition. But until CyberMedia puts more effort into the meat of the service—making the database of fixes more complete and up-to-date—I advise you to save your money. *CyberMedia Oil Change, $39.95 per year, www.cybermedia.com*



OIL CHANGE offers more fixes and features than any other service, but it identified only about a third of the possible updates in our tests.

TuneUp

Features Without Fixes

In the first few minutes of use, TuneUp looks promising. Though it has fewer features and options than Oil Change, TuneUp compensates with a clean, one-button interface that automatically installs updates. Unfortunately, TuneUp stumbled in my testing. For your $40 a year, you get almost nothing but frustration. ▶

Looks Can Be Deceiving

Oil Change and LiveUpdate Pro have more features than the other services, but none of the programs work as they should.

		APPLICATION SUPPORT				UPDATING				
Service	Price (per year)	Operating system	Commercial apps	Shareware/ freeware	Drivers	Scheduled downloads	Batch downloads	Automatic installation	Uninstall	History log
Catch-Up	free	Windows 95, NT, 3.1	●[1]	●	●	○	○	○	○	○
LiveUpdate Pro	$29.95	Windows 95	●	●	●	○	●	●[2]	●[2]	●
Oil Change	$39.95	Windows 95	●	●	●	●	○	●[2]	●[2]	●
TuneUp	$39.95[3]	Windows 95	●	●	●	○	○	●[2]	○	[illegible]
Update AnyWare	$29.95	Windows 95, NT	●	●	●	●	○	●[2]	○	●

● Yes ○ No [1] Limited. [2] Some updates may not allow automatic installation or uninstallation (because they require registration, for example). [3] Monthly price $4.95.

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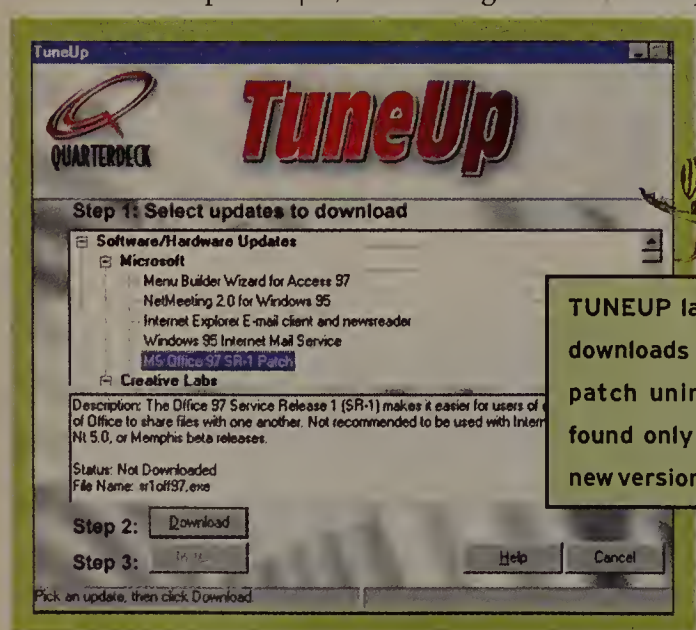
Circle 187 on reader service card

The bottom line: Of the 31 possible fixes my system needed, TuneUp suggested only 3—Office 97 Service Release 1, the current Graphics Blaster driver, and the Lotus Word Pro patch. It also found very few of the add-ons and wizards its competitors discovered, listing mostly Microsoft's free Power Toy and Kernel Toy Windows 95 add-ons, and a few random bits of shareware, including a fractal image generator. Whoopee!

TuneUp product manager Jim Houston attributed the service's poor performance in our tests to company developers' recent focus on converting the database to a new format. The converted database will work with TuneUp 3.0, which is due out in April. Houston acknowledged that Quarterdeck has not been able to update the database as often as the company would like during the conversion.

It gets worse. When I tried to grab the available updates, only two of them would actually download. After hunting around the TuneUp Web site (don't bother calling tech support—it's $9.95 per incident to speak to a live person), I discovered the reason: TuneUp isn't compatible with Internet Explorer 4.0, even though both products have been out for several months. TuneUp won't work with Netscape Navigator either if you have IE 4.0 installed on your PC. Quarterdeck's suggested work-around is to download updates manually after copying the URLs from text files that the program stores on your hard disk. Hello?



TUNEUP lacks scheduled downloads and automatic patch uninstalls, and it found only three fixes. A new version may do better.

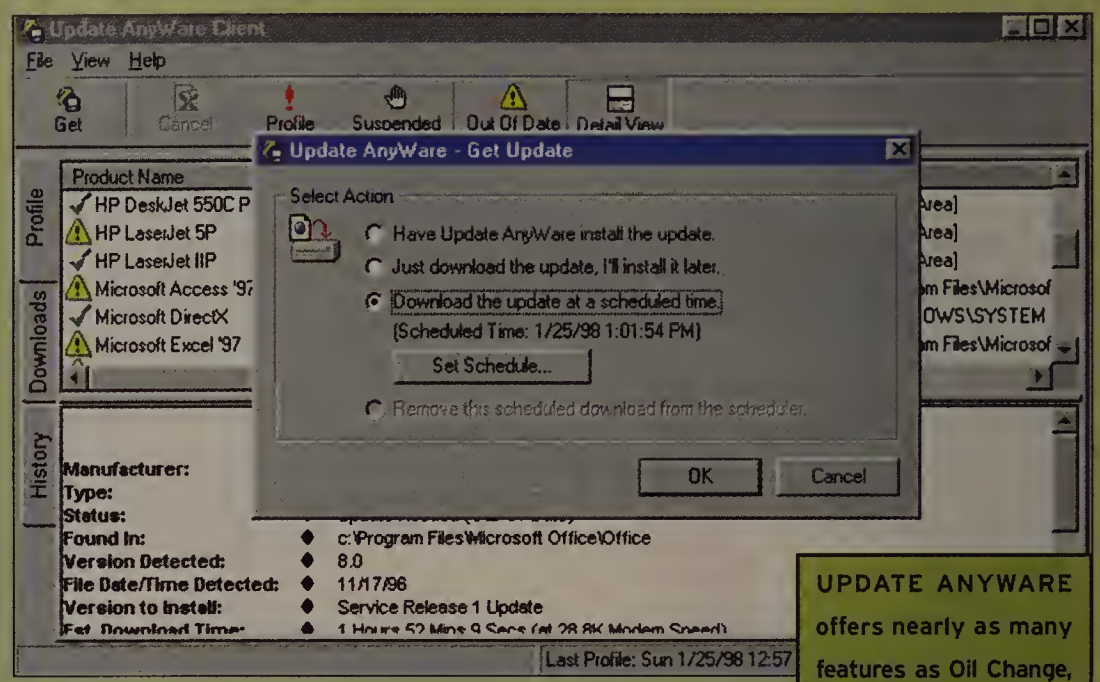
As we went to press, Quarterdeck was due to release the new version of the program. The company says it will offer more updates and patches than the one we tested, and it will solve the IE 4.0 compatibility glitch. TuneUp 3.0 should be available on Quarterdeck's Web site on April 15. *TuneUp, $39.95 per year, Quarterdeck, www.tuneup.com*

Update AnyWare

Anywhere but Here

Update AnyWare, from GreenTree, is a new player in the update service market. It offers some advanced features (including scheduled downloads) and costs a few bucks less than either Oil Change or TuneUp. Unfortunately, the service also apes its competitors' limited knowledge of updates—it found only five of them, and it completely ignored the Adobe, Corel, and Lotus products installed on my test system. Worse, it said that my aging video driver was the most recent one—misinformation that would steer trusting users away from the latest driver.

You can use Update AnyWare strictly from the Web site, or you can download client software that offers additional features like scheduled downloads. Either method enables you to streamline searches (by skipping nonessential updates), install the updates immediately, or download them for later installation to your system. The client software also tracks which updates you've already downloaded and maintains a history of those you've already installed. Unlike LiveUpdate Pro or Oil Change, however, Update AnyWare doesn't help you uninstall updates.



UPDATE ANYWARE offers nearly as many features as Oil Change, including scheduled downloads, but it located even fewer fixes.

Though less talented than the other services we tested, Update AnyWare pretty much matches Symantec's LiveUpdate Pro in price, performance, and features. GreenTree president Harold Lund told me that the company was working to increase the number of products in its database, which it updates every week. As we went to press, subsequent tests suggested only one additional patch—for Broderbund's Riven. Lund noted that the company was developing closer ties with game and 3D video board driver manufacturers, which could make Update AnyWare a good choice for Quake addicts (you know who you are). *Update AnyWare, $29.95 per year, GreenTree, www.updateanyware.com*

online

For a detailed explanation of our methodology and a list of the updates and fixes that were found by the five products we tested, visit www.pcworld.com/may98/update. Have you found a hardware or software bug? Tell us about it via e-mail at bugs@pcworld.com. Scott Spanbauer is a senior associate editor for PC World *and author of* Bugs and Fixes. *See page 14 for contact information.* ■

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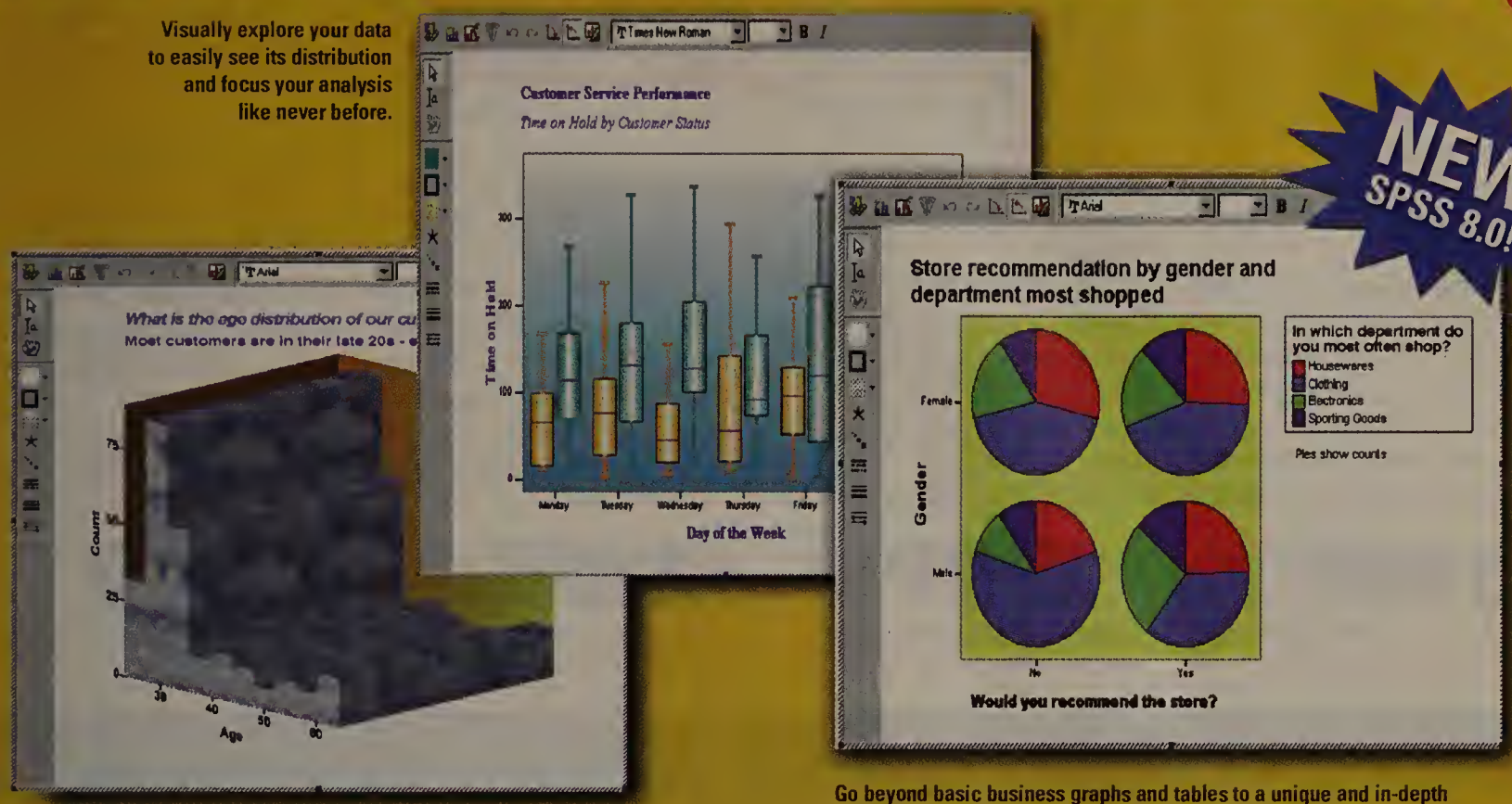

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FEATURING MMX TECHNOLOGY

Common features listed above plus:

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- 64MB SDRAM Memory
- 4GB Ultra ATA Hard Drive
- 128-bit Graphics Accelerator with 65K Colors at 1024x768
- 56K Capable™ K-Flex Modem
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- 56K Capable™ K-Flex Modem
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SHOTGUN™ TECHNOLOGY

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Why is everyone fired up over the new 56K standard? Because now, Diamond modems not only support the new ITU V.90 standard, but they include Shotgun™ technology—the double-barrel approach to increasing your modem speed up to 112K!

V.90

Shotgun is Diamond's exclusive technology that bonds together two modems to work over two ordinary phone lines. The result? One powerful Internet connection. For instance, keep your existing 33.6K modem, add a speedy Shotgun-enabled SupraExpress™ 56K modem to your PC, and get speeds up to 89.6K. Better yet, two 56K Diamond modems deliver up to 112K!

SHOTGUN™ TECHNOLOGY

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CONNECT with Rockwell

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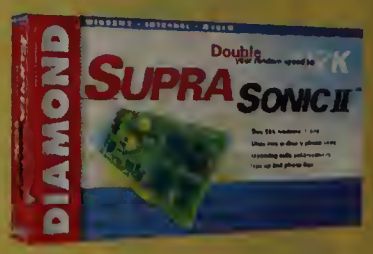

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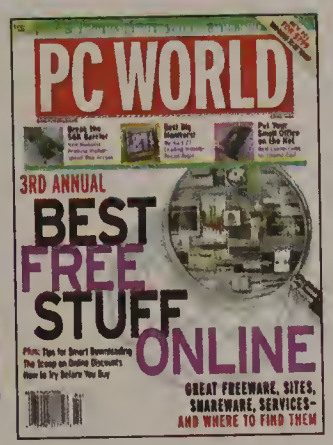

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The BEST of the WEB

The 1998 Webby Award Winners

Hollywood's got the Oscars; TV's got the Emmys, and the Internet's got the Webbies. Meet this year's greatest sites.

By James Oliver Cury

Suspend your disbelief for a second. Let's say you're stranded on a desert isle, and the Professor has built a Web browser out of two coconuts and a palm frond. As you'd expect, electricity is in scarce supply, and download times are...leisurely. So what handful of sites should you visit?

Might we suggest a tour of the 1998 Webby Award winners, the most creative and innovative sites on the Web? Sponsored in part by *PC World* parent company IDG, the second annual Webbies showcased 95 nominees—and 19 eventual winners—in categories ranging from Arts to Music, from News to Weird (every category *but* computers, since IDG.net, PC World Online, and other IDG sites would have posed a conflict of interest).

The editorial staff of *The Web* magazine (a spin-off of *PC World*) selected the 95 finalists from more than 4000 sites reviewed either in print or online at www.webmagazine.com. To qualify, sites had to excel in content, design, and links. The worthy 95 then went before a handpicked panel of independent experts, who pored over the nominees and selected their favorites.

No slouches here: The Webby judges included CEOs, presidents, editors, directors, deans, founders, producers, and publishers. Not to mention such luminaries as *Dilbert* cartoonist Scott Adams (Money/Business), *Chasing Amy* director Kevin Smith (Film), former California governor Jerry Brown (Politics), composer and virtual reality pioneer Jaron Lanier (Music), and Chicago Bulls bad boy Dennis Rodman (Weird, but of course).

VICTORY SHOCK: Ellen McDermott of CitySearch New York City (below) and Sean Simon of AudioNet (below left) collect the coveted coil.

Following tabulation of the judges' votes, winners were announced on March 6 at a gala awards ceremony at San Francisco's Palace of Fine Arts. In the following pages, we present the nominees and winners of this year's Webbies (a complete list of the judges and live links to the nominated sites appear at www.webbyawards.com).

So cancel all of your appointments, fire up those coconuts, and come on in—the surfing's fine.

James Oliver Cury is a New York–based freelance writer and a former senior editor at The Web *magazine.*

100,000 Web Surfers Can't Be Wrong

THE DIGERATI WEREN'T THE ONLY ONES voting with their mice. Complementing the Webby Awards, members of the Web-browsing public cast their own ballots to determine the 1998 People's Voice Awards. The voting process, which ran from December 2, 1997, to January 31, 1998, solicited the judgment of 100,000 Web surfers, who visited the 95 Webby-nominated sites and made their own picks (indicated on the following pages by a gold star) in each of the 19 categories. As it turned out, the masses and the elite agreed on only 3 of the 19 winners. Check out both sets of winners and see whose preferences you share. And watch for next year's nominees; voting for the 1999 Webby Awards begins in December 1998.

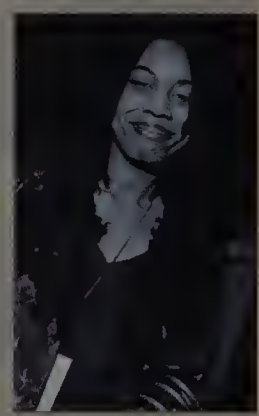
ARTS

ENTROPY8

www.entropy8.com

The online gallery of 26-year-old photographer/sculptor/Web designer Auriea Harvey—and a Webby winner for the second straight year.

SITE SPECIFICS: Harvey, formerly an art director at Poppe Tyson Interactive, used this site as a launching pad for her Web design firm, Entropy8 Digital Arts. "It's the equivalent of an amateur home page, where people display photos of their dog—but with better pictures."



TOP DRAWS: The gallery section is especially popular, "because visitors like the animated interface. And it's the place where you see most of the work I've done outside of being digital."

NOMINEES:

äda 'web	www.adaweb.com
★ Atlas	www.atlasmagazine.com
RGB Gallery	www.hotwired.com/rgb
Sfgallery	www.sfstation.com/sfgallery

COMMUNITY

THE WELL

www.thewell.com

The prototype of the virtual community, the Well is a subscription-based conferencing system that enjoys a fanatical following.

TOP DRAWS: "The media conference is a star conference; there are a lot of writers and journalists and broadcasters and also media critics. The Generation X conference is more playful but also really popular. Books and movies are always very strong. Weird is somewhat legendary. And the Grateful Dead conferences—even after Jerry's death—remain strong."

NOMINEES:

bianca.com	www.bianca.com
The Palace	www.thepalace.com
Tripod	www.tripod.com
★ WBS	pages.wbs.net

PHOTOGRAPHS (CLOCKWISE FROM TOP): ROBERT CARDIN, JACK GESCHEIDT (2)

EDUCATION

STARCHILD

starchild.gsfc.nasa.gov

A NASA-sponsored astronomy site for children ages 4 to 14, with kid-friendly graphics, photos, and quiz questions.

SITE SPECIFICS: "We wanted to put up a place for young kids because every 6-year-old is excited about space. So in the summer of '96, two teachers spent their summer writing the text and developing the activities for the site....We'd never been in the same room at the same time; this collaboration has really taken place over the Internet."

NOMINEES:

Educational Resources Information Center (ERIC)	www.aspensys.com/eric
Learn2.com	www.learn2.com
★ The Smithsonian	www.si.edu
The Teel Home Education Page	www.teelfamily.com/education

FILM

THE INTERNET MOVIE DATABASE

www.imdb.com ★

An exhaustive filmography database, fully searchable and hypertext-linked.

SITE SPECIFICS: "The largest independent movie site on the Web... and de facto home page for Hollywood," IMDB was founded by Oxford University scholar Col Needham in 1990 and launched on the Web in September 1993. Today, it boasts information about more than 130,000 movies from the 1890s to 2002 (yes, future films), as well as entries on 2 million films and 500,000 people. It's also a two-time Webby Award winner.

NOMINEES:

E! Online	www.eonline.com
Film.com	www.film.com
Mr. Showbiz	www.mrshowbiz.com
rough cut	www.roughcut.com

GAMES

BEZERK

www.bezerk.com

Berkeley Systems' online collection of multiplayer games, from word mind-bender Acrophobia to irreverent "netshow" trivia fest You Don't Know Jack.

SITE SPECIFICS: "Shortly after Acrophobia launched, we received letters from college students blaming us for failing their finals.... And a note from the 'Jack the netshow' side said, 'I think the answer to this question is wrong, and you better look it up because my wife beat me because of this question, and I've been paying the price ever since!'"

NOMINEES:

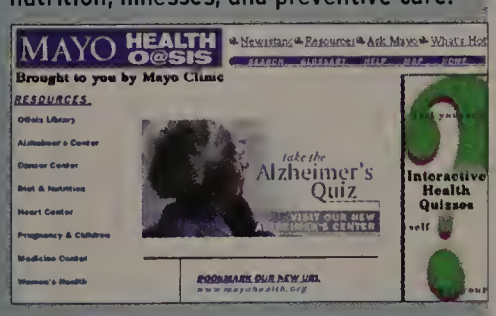
Gamecenter.com	www.gamecenter.com
GameSpot	www.gamespot.com
★ Imagine Games Network	www.imaginegames.com
PlaySite	www.playsite.com

HEALTH

MAYO CLINIC HEALTH O@SIS

www.mayohealth.org

"Geared to the lay public—not physicians or nurses," O@sis offers current information on nutrition, illnesses, and preventive care.



SITE SPECIFICS: Its site launched in 1995, but the Mayo Clinic is over 100 years old.

TOP DRAWS: "Ask Mayo, a service where people submit questions, then answers to select questions are posted online. Interactive quizzes are also popular. They offer an easy and fun way to learn about health issues, from cholesterol to alcoholism."

NOMINEES:

★ Ask Dr. Weil	drweil.com
Reuters Health Information Services	www.reutershealth.com
The Body: A Multimedia AIDS and HIV Resource	www.thebody.com
thriveonline.com	www.thriveonline.com

HOME

BABYCENTER

www.babycenter.com

A resource for expectant and new parents.

SITE SPECIFICS: "We had a woman go into labor in one of our chat rooms. Other people in the chat room told her to leave work and go to the hospital."

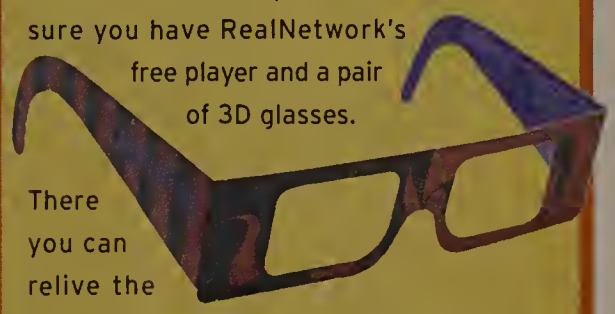
TOP DRAWS: "Personal Page, where people provide us with their due date or birth date and we provide weekly updates of what they should be thinking about at each stage of pregnancy or any change of development. We also have Baby Namer—where you enter your criteria and we'll suggest all the names from a database of 5000 that match."

NOMINEES:

★ Better Homes and Gardens Online	www.bhglive.com
Disney's Daily Blast	www.disneyblast.com
Family.com	www.family.com
Virtual Garden	vg.com

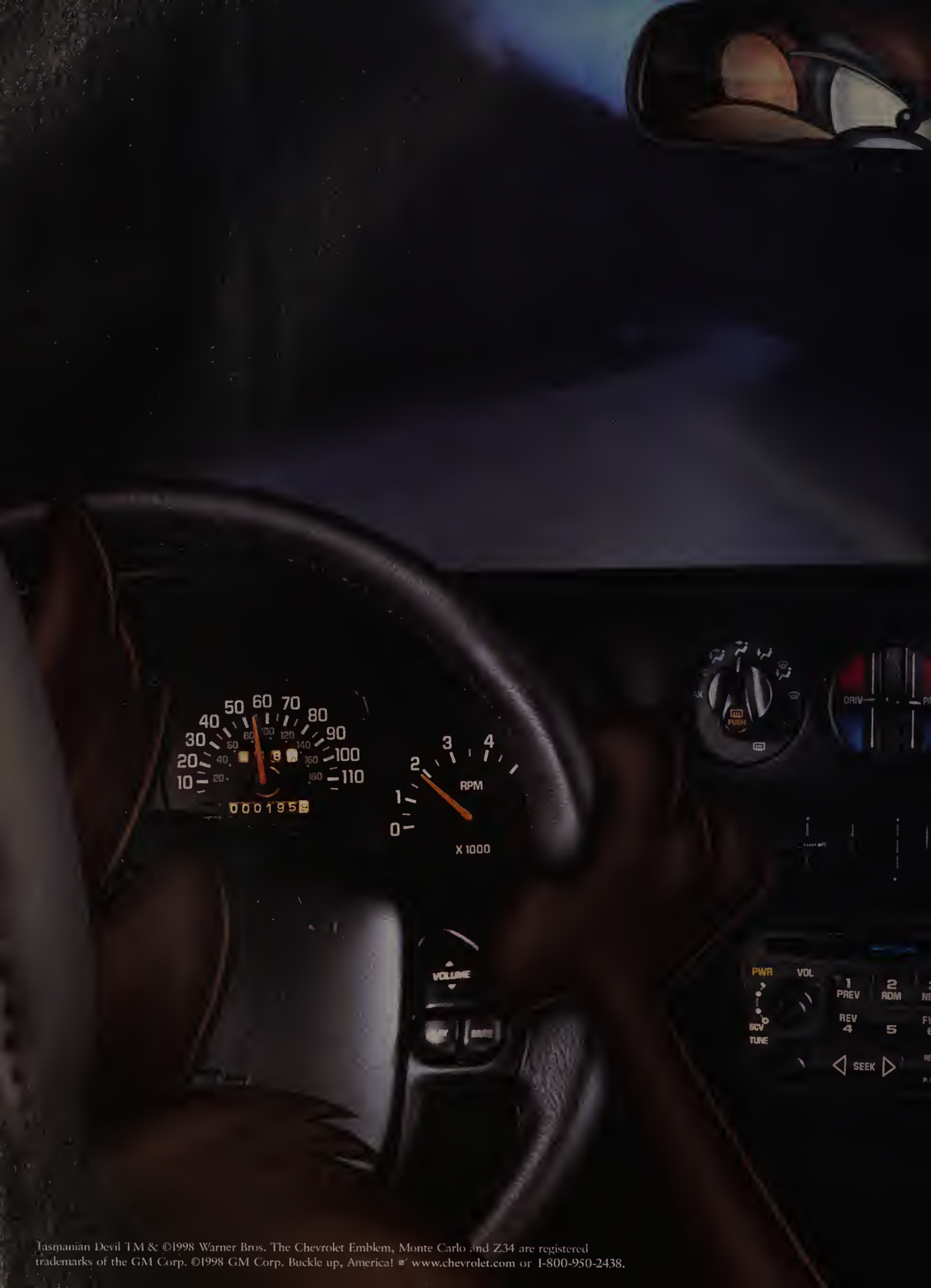
1998 WEBBY AWARDS: World's First 3D Webcast

REMEMBER 3D MOVIES? You'd perch a pair of stiff cardboard specs on your nose, and suddenly you were inches away from the action. Well, 3D is back, but now it's online. Just visit www.webbyawards.com—and make sure you have RealNetwork's free player and a pair of 3D glasses.



There you can relive the world's first-ever 3D cybercast. Even if you don't have the glasses, you can still hobnob with the celebrity judges and meet the folks behind the Webby Award-winning sites, though you'll have to settle for 2D.

★ Indicates the People's Voice Award winner



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Genuine Chevrolet

LIVING

gURL
www.gurl.com

An interactive zine for teen girls, tackling the topics that never go away: beauty, culture, emotions, and sexuality.

SITE SPECIFICS: "We're popular with girls of this age group because we aren't afraid to be direct and humorous in discussing changes in bodies and different things girls encounter in adolescence. I think they're used to people skirting around the issues....It's a way for girls to deal with these anxieties instead of trying to find a product-based cure—which most publications for adolescent girls focus on."

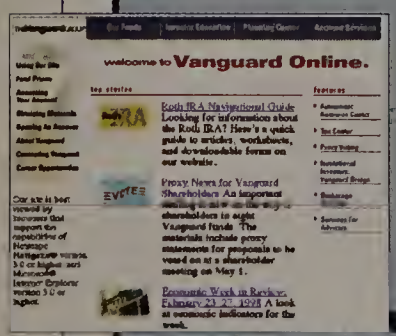
NOMINEES:

★ PlanetOut	www.planetout.com
Swoon	www.swoon.com
Virtual Jerusalem	virtual.co.il
WeddingChannel	www.weddingchannel.com

MONEY/BUSINESS

THE VANGUARD GROUP
www.vanguard.com

A refreshingly even-handed guide to financial matters ranging from tax law strategies to retirement planning, this site also serves as a convenient spot "for investors to learn about Vanguard and to execute transactions and interactions with Vanguard."



SITE SPECIFICS: "Somebody told us that the IRS was telling people who have questions about Roth IRAs to contact Vanguard because we've got a great series of tools."

TOP DRAWS: The front page, which carries regularly updated news, and the (now withdrawn) area on last year's tax relief act.

NOMINEES:

International Real Estate Digest	ired.com
★ Nolo Press Self-Help Law Center	www.nolo.com
The Financial Aid Information Page	finaid.org
U.S. Securities and Exchange Commission	www.sec.gov

MUSIC

EXPERIENCE MUSIC PROJECT
www.experience.org

An interactive preview of Seattle's Experience Music Project Museum.

SITE SPECIFICS: Funded by Microsoft cofounder Paul Allen, the museum is dedicated

to the creative process in American music—rock and roll, jazz, and blues. The online version invites visitors to "look at our exhibit, ideas, and artifacts of rock and roll history."

TOP DRAWS: Northwest Passage, with its illustrated grunge family tree, and the Guitars section, which lets Web surfers compare the sounds of different guitars.

NOMINEES:

Addicted to Noise	www.addict.com
★ MTV Online	www.mtv.com
TheDJ	www.thedj.com
Tunes.com	www.tunes.com

NEWS

NEWS.COM
www.news.com

A late-breaking-technology news site.

TOP DRAWS: "The Apple stories are always a good draw; it's interesting how passionate the Apple readers are. The launch of the browsers has been a huge story, too. And we did a really humongous package on ActiveX, looking at where ActiveX is going, and that was a comprehensive report—and a big hit."

NOMINEES:

★ ABCNews.com	www.abcnews.com
MSNBC	www.msnbc.com
The New York Times on the Web	www.nytimes.com
Wired News	www.wired.com/news

POLITICS/LAW

CNN/TIME ALLPOLITICS.COM
allpolitics.com ★

CNN and *Time* magazine team up to offer political news, analysis, and polls.

SITE SPECIFICS: "We aren't required to wait until the evening news at 6 or the next news break on CNN....During the Senate campaign fundraising hearings, we were streaming live video, gavel to gavel....The most embarrassing moment for us was when we had about seven weeks to launch the site. We set up the e-mail box and didn't realize what the response would be. We were backlogged by probably 10,000 messages. For about five months, we spent time trying to dig ourselves out. It was a true understanding of what an interactive medium the Web is."

NOMINEES:

Annoy.com	www.annoy.com
Law Journal Extra	www.ljx.com
The Black World Today	www.tbwt.com
The Smoking Gun	www.thesmokinggun.com

PRINT/ZINES

SALON MAGAZINE
www.salonmagazine.com

A smart, lively, daily Web review of politics, arts, and entertainment. Think the *New Yorker*, but online.

SITE SPECIFICS: "Like a good dinner party, Salon prides itself on having an interesting group of people at the table who are happy and willing to argue with each other and thrash out the leading issues of the day."

TOP DRAWS: "Our books coverage—which includes book reviews, author interviews, and cover stories on major books—has been consistently popular. We have an unusually strong literary audience."

NOMINEES:

alt.culture	www.altculture.com
Literary Kicks	www.charm.net/~brooklyn/LitKicks.html
★ Merriam-Webster	www.m-w.com
The Libyrinth	www.rpg.net/quail/libyrinth

★ Indicates the People's Voice Award winner

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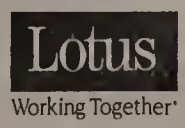

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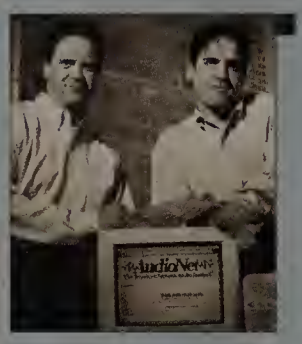
RADIO

AUDIONET
audionet.com

An online broadcast network delivering music, sports, and talk shows via RealPlayer.



SITE SPECIFICS: "AudioNet delivers more live and on-demand audio and video broadcasts than any other company in the world to the largest multimedia audience on the Web."

TOP DRAWS: "Radio and sports are the most popular. Most AudioNet radio listeners can't receive the signal of their favorite local radio station in their office buildings. Many college alumni and other sports fans live far away from their favorite station or sports team."

NOMINEES:

Antique Radios Online	www.antiqueradios.com
DigiBand Radio	www.digiband.com
★ The Art Bell Web Site	www.artbell.com
Uncle Ricky's Reel Top 40 Repository	www.reelradio.com

SCIENCE

EXPLORATORIUM: EXPLORANET
www.exploratorium.edu

An online museum of the physical and life sciences, art, and perception.

SITE SPECIFICS: "We're an extension of the Exploratorium Museum itself [located in San Francisco], presenting information and things for people to try and do, and hopefully experiment and learn on their own....Think of it as a museum floor without any walls."

NOMINEES:

IBM Patent Server	patent.womplex.ibm.com
★ Mars Pathfinder Mission	mpfwww.jpl.nasa.gov/default1.html
Paleontology Without Walls	www.ucmp.berkeley.edu/exhibit/exhibits.html
Scientific American	www.sciam.com

SPORTS

CBS SPORTSLINE
www.sportsline.com

A free Web site (plus some membership components), devoted to "sports information, entertainment, and merchandise." Covers the basics—baseball, basketball, football, and hockey—plus cricket, soccer, and other less mainstream enthusiasms.

SITE SPECIFICS: "Apple Computer may have started in a garage; we started four years ago in a hotel lobby—at the Westin in Fort Lauderdale, Florida."

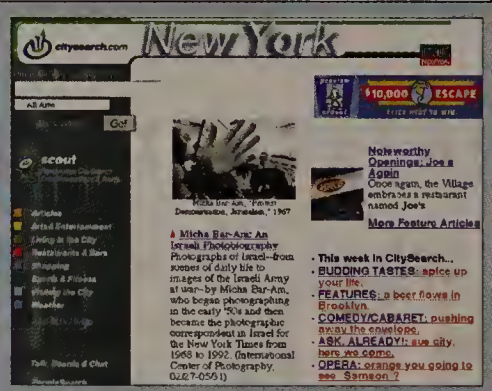
TOP DRAWS: "Whatever's happening right now: scores, news, chat, columns."

NOMINEES:

Charged	www.charged.com
★ ESPN SportsZone	espnet.sportszone.com
Outside Online	outside.starwave.com
Science of Hockey	www.exploratorium.edu/hockey

TRAVEL

CITYSEARCH NEW YORK CITY
newyork.citysearch.com



One of 19 regional CitySearch sites—some of them not yet open—CSNYC covers "everything from arts and entertainment to dining to shopping to living in the city."

TOP DRAWS: Arts & Entertainment is the most popular—including music, movies, art galleries, and museums: "It's really the core of what we're about." Restaurants & Bars also gets consistently high traffic.

NOMINEES:

Lonely Planet Online	www.lonelyplanet.com
Preview Travel	www.previewtravel.com
Salon|Wanderlust	www.salonmag.com/wanderlust
★ Travelocity	www.travelocity.com

TV

PBS ONLINE
www.pbs.org

An online supplement to the PBS network's educational programming (*P.O.V.*, *Nova*, *The NewsHour with Jim Lehrer*, and so on).

SITE SPECIFICS: "We reach every type of user. We have 4-year-olds dragging their parents to the computer because they want to see *Arthur* or *Sesame Street*....We received an e-mail from a father who said his 6-year-old was writing www.pbs.org in chalk on the basement floor....And we hear from senior citizens who tell us they are buying modems to go to the Online NewsHour."

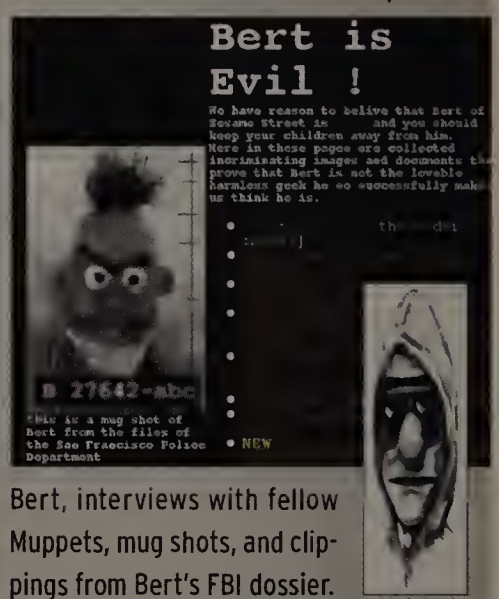
NOMINEES:

Gist TV Listings	www.thegist.com
NBC.com	www.nbc.com
★ Sci-Fi Channel: The Dominion	www.scifi.com
TV Guide Entertainment Network	www.tvguide.com

WEIRD

BERT IS EVIL!
fractalcow.com/bert ★

This tongue-in-cheek send-up of the mild-mannered, occasionally disgruntled *Sesame Street* character boasts doctored photos of



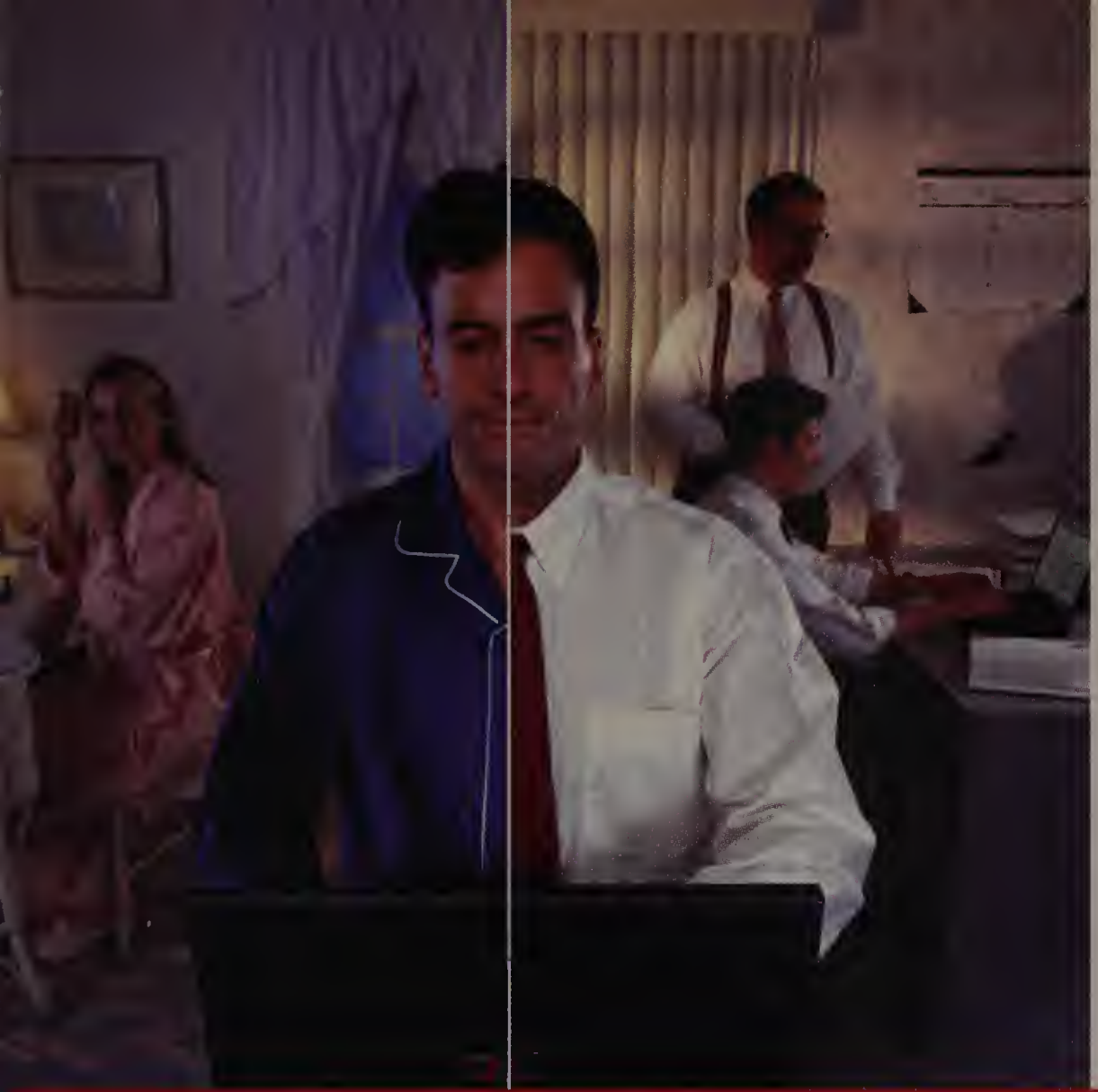
Bert, interviews with fellow Muppets, mug shots, and clippings from Bert's FBI dossier.

SITE SPECIFICS: "I was very affected by the death of Mr. Hooper from *Sesame Street* when I was a child," says site creator Dino Ignacio. "I think I can trace all aspects of my maldeveloped, maladjusted mind to this event....I wanted to see if I could change the world's perspective of a childhood icon."

NOMINEES:

Blair	www.blairmag.com
Museum of Dirt	www.planet.com/dirtweb/dirt.html
The Crash Site	www.crashsite.com
The Onion	www.theonion.com

★ Indicates the People's Voice Award winner



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Circle 176 on reader service card

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PC Computing

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Byte

"The Elite 802's image is solid in all respects, all the way up to 1800 x 1440 ... excellent performance at a reasonable price"

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PC World

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HITACHI-NSA, 200 Lowder Brook Drive, Westwood, MA 02090 TEL: 800 441-4832. Faxback: 800 555-8552. www.nsa-hitachi.com

HITACHI

Circle 114 on reader service card

PC WORLD

TOP 100

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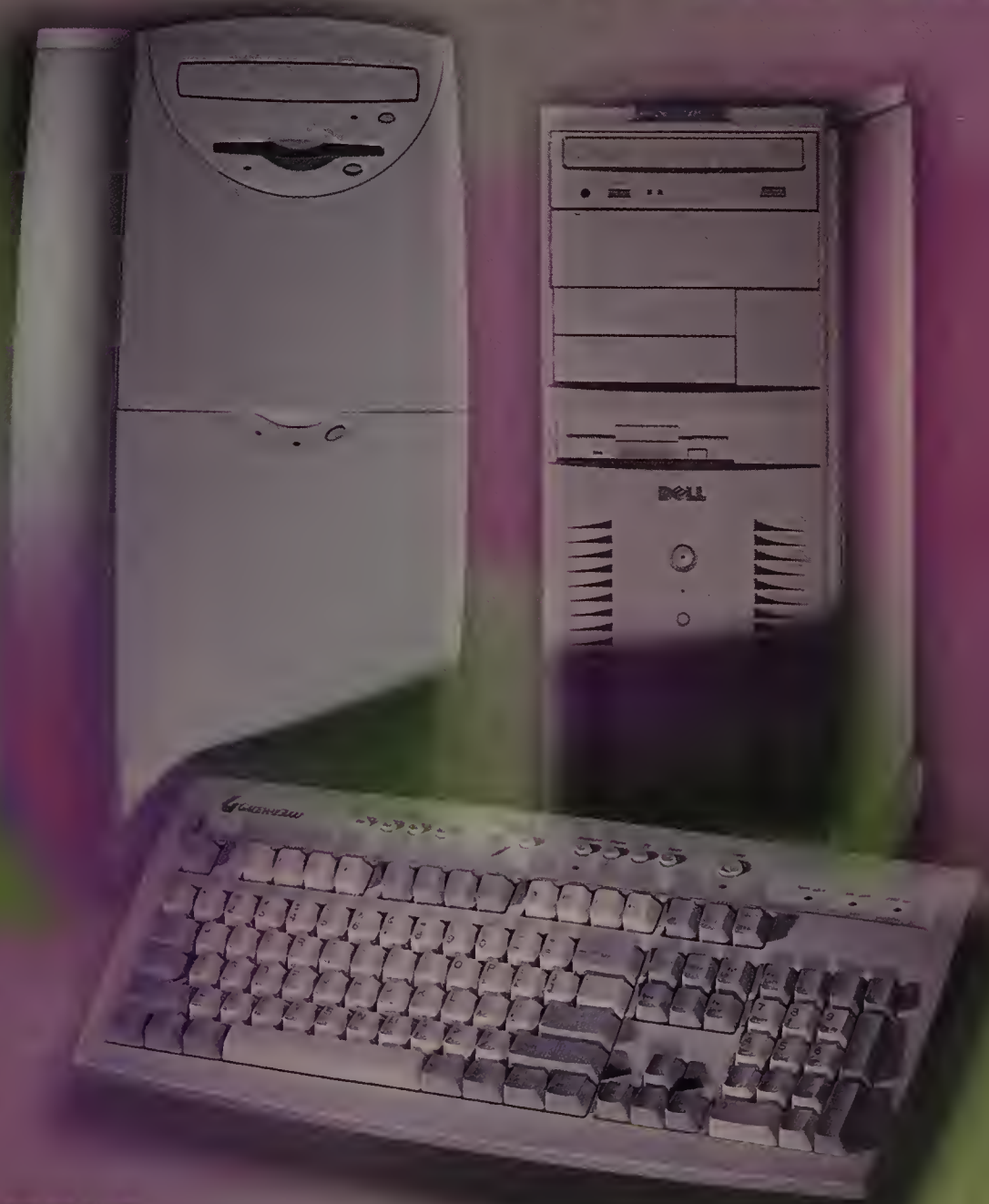
SUB-$1000 Bargains, 333-MHz Beasts

EDITED BY JOANNE ROBB AND ANDREW BRANDT



BEST BUY STANDOUTS: Gateway's G6-266b, with its new keyboard (left), and Dell's Dimension XPS D333 lead the budget and power charts, respectively.

PHOTOGRAPHS: ROBERT CARLSON CONE, JEFF [illegible]

IMAGINE A WORLD where your TV became hopelessly outdated in two years and you couldn't watch the latest shows on it, or where your new car looked like everyone else's but worked so differently that you couldn't drive it on some roads.

Owning a personal computer is kind of like that. It's no wonder we anguish over which one to buy. When you're spending somewhere between the cost of a 35-inch TV and that of a good used car, you want to make sure the PC will stay technologically relevant for as long as possible.

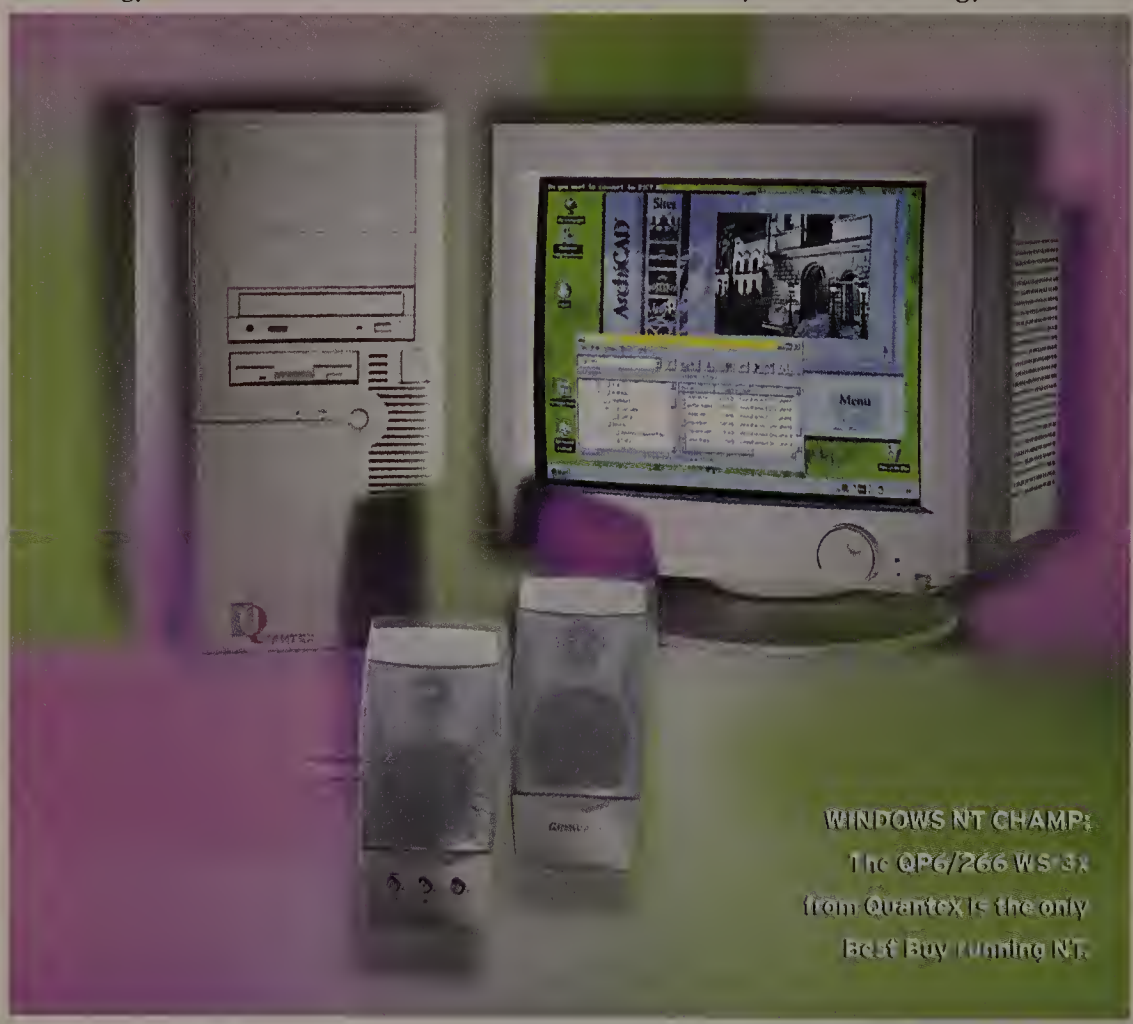
THE GOOD OLD DAYS

YOU CAN'T obsolescence-proof a PC—the technology moves too fast. But a PC with the latest processor and features should last you for at least a couple of years. Right now that system will cost you about $3000.

This amount will buy you this month's number one Best Buy power desktop, the Dell Dimension XPS D333. It ships with a 56-kbps modem and an Accelerated Graphics Port video card (a hedge against the day AGP-enhanced software may become available). It also includes Microsoft Office 97, the best of the big office suites; a second-generation DVD-ROM drive; an 8GB hard disk; and 64MB of RAM.

But by the time you read this in early April, the power of the high-end personal computer will have increased once again. Intel's new 350- and 400-MHz processors are scheduled to ship in new systems in April. Some vendors claim that these machines will run up to 20 percent faster than those using Intel's 333-MHz Pentium II, currently the fastest CPU on the market. But the new processor is not dramatically new technology, and the expected price tag of some of these systems—around $3500—is stingingly high.

You can't obsolescence-proof a new PC, but you can hedge your bet with the latest (if expensive) gear.



WINDOWS NT CHAMP: The QPC/266 WS 3X from Quantex is the only Best Buy running NT.

PC IN A POUCH

THE WORD *budget* meant "pouch" or "bag" in Middle English. If you have a bag with $2000 in it today, a budget PC might be a good option—think of it as "power lite." Gateway's $1939 G6-266b is typical: A 56-kbps modem and an AGP graphics board are standard; the PII-266 CPU is slightly slower; the hard disk and monitor are a bit smaller; and you get half the RAM and a CD-ROM drive instead of DVD.

What about these sub-$1000 PCs that you've heard so much about? Well, you'd better lower your expectations. Sub-$1000s use older technology to keep prices low—we're talking MMX processors, 2GB hard drives, and 14- or 15-inch monitors. Most of these systems are ill-equipped to make our Top 20 charts. However, two sub-$1000 PCs—without monitors, that is—from HP and IBM make this month's Top 10 Home PCs chart.

The latest ultrathin and superlight laptop PCs trade some features for portability. Sony's Pentium MMX-233–based VAIO PCG-719C, at $2999, landed in fourth place on our power notebooks chart. The lavender-colored VAIO is lighter and more compact than a traditional laptop, but durability could be a problem with the thinner plastic that Sony used to keep the weight down: Three of the unit's port covers broke off during our evaluation.

We merged our separate lists of 33.6-kbps and 56-kbps modems into a single Top 10 this month. It's getting harder to find 33.6-kbps modems, and 56-kbps units are cheaper than ever—costing less now than some 33.6-kbps modems ever did.

OUR TESTS GET A FACE-LIFT

YOU MAY WONDER why this month's benchmark numbers dropped like the Asian stock market. It's because we've updated our benchmark test suite. (See "PC WorldBench Gets Pumped Up.") PC WorldBench 98 incorporates three improvements: We've updated all test applications to 32-bit versions; we can now test PCs running Windows 98 and NT in addition to Windows 95; and we have a new reference PC (hence the lower performance scores).

A relatively small percentage of PC buyers choose NT machines, but the number is growing. Of the more than 130 desktops and laptops we tested this month, 9 came with Windows NT 4.0. These PCs con-

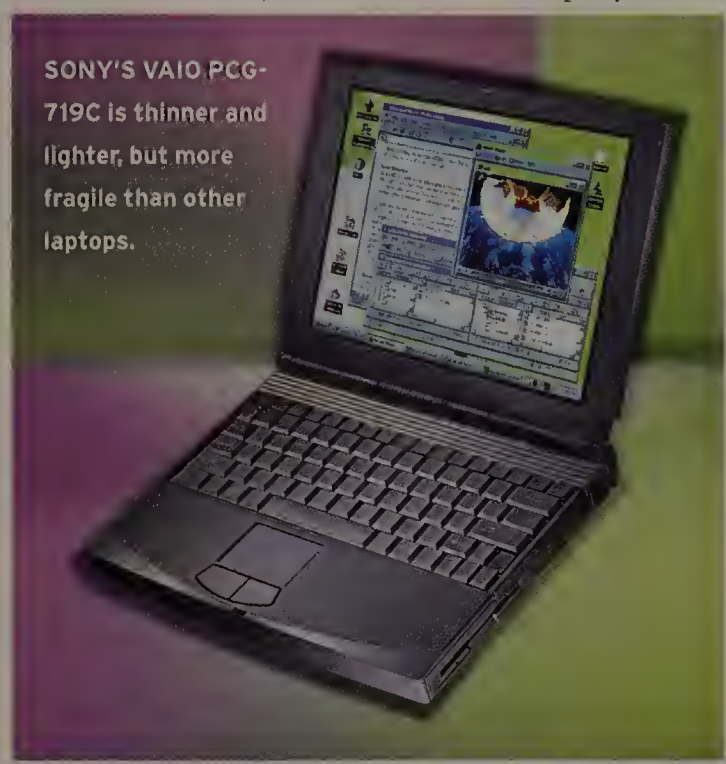
sistently ran 13 to 28 percent faster than Windows 95 machines in our tests. The faster the processor, the greater the difference: The gap between NT and Windows 95 with a Pentium MMX-233 system was 13 percent, but on a PII-300, NT was 28 percent faster.

Microsoft says Windows NT works some magic that Windows 95 does not. It caches graphic bit maps, for example, so dialog boxes open faster. But the NT performance boost we saw was wildly different across applications. Our Word Pro 97 word processing scripts ran nearly twice as fast under Windows NT, while Excel and Paradox gains were more modest, at around 5 to 13 percent.

Despite good overall performance, NT has some drawbacks. Windows 95 works with more peripherals and, surprisingly enough, can be more stable running older applications. Windows NT also costs $100 more, on average, than Windows 95.

SLOW DRIVING WITH GATEWAY

SOME OF THE GATEWAY GP5 and G6 systems we tested for this issue performed so abysmally we thought we'd misread the processor speed. After working with Gateway technicians, we discovered the culprit: problems with the specialized driver for Gateway's new multifunction keyboard. Once the company released a bug-fixing update, the PCs' performance improved markedly in our tests.



SONY'S VAIO PCG-719C is thinner and lighter, but more fragile than other laptops.

If you purchased a GP5- or G6-series system from Gateway after March 23, it should have the latest drivers installed. Otherwise, you may experience the same performance lag we did. You can find out if you have the updated driver set by checking a couple of things. First, go to the Windows Control Panel (*Start•Settings•Control Panel*) and open the *Multi-Function Keyboard* applet. At the bottom of the Info tab, look for the latest version number: 3.9.5. Next, use Device Manager to see if an Intellitype keyboard driver is installed. It shouldn't be.

If you have an older driver configuration, here's how to gain some speed. Replace the outdated multifunction keyboard driver by downloading the new driver set from Gateway's Web site (www.gateway.com). The company says you can just remove the Intellitype driver using Windows 95's Add/Remove Programs applet in the Control Panel.

JoAnne Robb and Andrew Brandt are associate editors for PC World. *Assistant Editor Mick Lockey, Staff Editor Grace Aquino, Associate Editor Vince Bielski, Senior Associate Editor Bryan Hastings, and freelance writers Nancy Canning, John Jacobi, Alex Jorge, Jeff Kuta, and James A. Martin contributed to the Top 100. Testing for the Top 100 was performed by Ulrike Diehlmann, Robert James, Elliott Kirschling, Jeff Kuta, and Mike Salayko of the PC World Test Center.* *See page 14 for contact information.* ▶

PC WORLDBENCH GETS PUMPED UP

JUST AS PC VENDORS have to keep up with the latest technology, every year or two we have to update our benchmark tests. Starting with this issue, we're launching PC WorldBench 98, the second generation of the test suite we rely on to measure the speed of desktops and laptops.

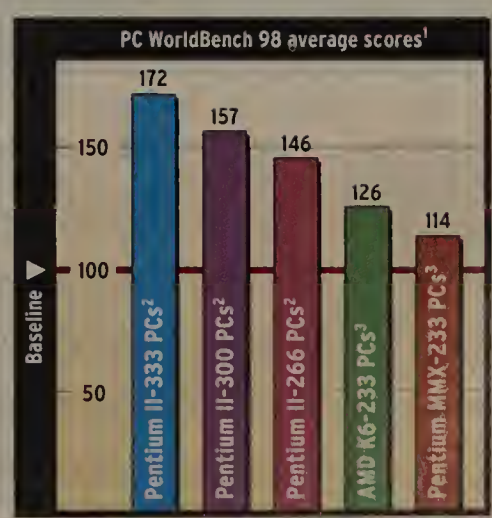
The most important change the PC World Test Center made to the benchmark was to add support for more operating systems. Designed to run only on Windows 95 systems, the previous version of PC WorldBench was fine when few *PC World* readers used Windows NT and when Windows 98 was only a code word. Now PC WorldBench runs on all three operating systems.

The Test Center also upgraded all the PC WorldBench 98 applications to the most current versions: Word 97, Excel 97, Picture Publisher 7.0, Paradox 8.0, Word Pro 97, and 1-2-3 97. In one case, we were forced to change applications. We had used WordPerfect, but we couldn't get it to run consistently with PC WorldBench 98, so we switched to Word Pro.

Finally, we updated the reference PC that we compare all systems to. Before, we gauged each system's performance against a Dell Dimension Pentium-75, a dinosaur by today's standards. Our new reference machine is a Gateway G5-200 with a Pentium MMX-200 CPU—the minimum configuration we'd recommend anyone buy today. To see how the latest PCs stack up to this reference system, check the chart below. For more information on PC WorldBench 98, see the FAQs page on our Web site (www.pcworld.com/benchmark).

PC WorldBench 98—Pick Your Processor

LOOKING FOR POWER? Running Windows 95, the scores of the swiftest systems in our Top 20 charts—Pentium II-333 PCs—average 72 percent faster than our baseline Gateway G5-200 MMX, a Pentium MMX-200 system.



[1]Averages based on the following PC counts: 6 PII-333s, 18 PII-300s, 4 PII-266s, 4 AMD K6-233s, 5 PMMX-233s.

[2]64MB of RAM. [3]32MB of RAM.

PC WORLD

TOP 20 POWER DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (2/11/98)	CPU	Comments
1	Dell Dimension XPS D333 800/388-8542 www.dell.com	n/a	retested [2]	$2929	Pentium II-333	$270 price drop puts this loaded Pentium II-333 in top place, 2X DVD-ROM drive.
2	Micron Millennia XKU 300 888/634-8799 www.micronpc.com	3	retested [2]	$2998	Pentium II-300	$76 price cut on very fast PC with great 19-inch monitor. XKU 333 also a good buy.
3	Gateway E-3110 300 800/779-2000 www.gateway.com	6	retested [2]	$2748	Pentium II-300	$241 price drop on quick, loaded corporate Pentium II-300; 19-inch monitor, ethernet.
4	Gateway G6-266 800/846-2000 www.gateway.com	2	retested [2]	$2550	Pentium II-266	$211 off quick, good-looking PC with 19-inch monitor.
5	Quantex QP6/300 SM-4x 800/896-4898 www.quantex.com	9	retested [2]	$2549	Pentium II-300	$450 nosedive on price helps this well-stocked Pentium II-300 earn a Best Buy.
6	Gateway G6-300 800/846-2000 www.gateway.com	n/a	retested [2]	$2963	Pentium II-300	Powerful PII-300 drops "XL" from its name; 2X DVD-ROM drive.
7	Cybermax PowerMax 7 800/437-4596 www.cybmax.com	n/a	retested [2]	$2263	Pentium II-300	Not a speed demon, but very well priced for a Pentium II-300.
8	HP Vectra VL 7 800/322-4772 www.hp.com	n/a	NEW	$3030	Pentium II-333	Fastest machine we've ever tested has high price; tested under Windows NT.
9	Micro Express MicroFlex-F300B 800/989-9900 www.microexpress.net	n/a	NEW	$2299	Pentium II-300	Generic Pentium II-300 includes 2X DVD-ROM drive; skimpy hard drive and modem.
10	HP Brio PC 800/533-1333 www.hp.com	n/a	NEW	$2517	Pentium II-300	Well-designed PC has average components, handy multifunction keyboard.
11	Dell Optiplex GXa 266 800/289-3355 www.dell.com	4	retested [2]	$2434	Pentium II-266	$84 off ethernet-equipped corporate PC with great design, fine reliability and support.
12	NEC Direction SPL 333 888/863-2669 www.necnow.com	7	retested [2]	$2487	Pentium II-333	A fast CPU in a well-designed and affordable midtower.
13	Quantex QP6/300 SM-4xSE 800/896-4898 www.quantex.com	n/a	retested [2]	$2499	Pentium II-300	Slightly slow Pentium II-300 comes with 2X DVD-ROM drive and 56-kbps modem.
14	Sys Technology Sys Performance Pro 300LA 800/613-9963 www.systechnology.com	11	retested [2]	$2791	Pentium II-300	$419 price drop on Pentium II-300 with first rate components; now tested with NT 4.0.
15	Kingdom Pinnacle 300/P2 800/385-3436 www.kingdomcomputers.com	n/a	retested [2]	$2594	Pentium II-300	Otherwise generic small-office machine has top-notch AGP card.
16	NEC PowerMate Enterprise 8000 888/863-2669 www.nec-computers.com	n/a	NEW	$2818	Pentium II-333	Fastest Windows 95 machine we've tested; missing modem.
17	Polywell Poly 700L5 PII 300 800/999-1278 www.polywell.com	n/a	NEW	$2350	Pentium II-300	Fast Pentium II-300 has PCI card and AGP capabilities, good expandability.
18	Vektron Super PowerStation PII-300 800/725-0026 www.vektron.com	17	retested [2]	$2399	Pentium II-300	Very fast, loaded Pentium II-300 with 19-inch monitor, $296 price drop.
19	Compaq Deskpro 6000T 800/345-1518 www.compaq.com	n/a	NEW	$4000	Pentium II-300	Expensive PC is well designed for corporate world; tested with Windows NT.
20	Everex StepStation 2 800/383-7391 www.everex.com	n/a	NEW	$2550	Pentium II-300	Plain-Jane Pentium II-300 with NT comes with crisp monitor, ethernet.

Best Buy See features chart, page 232; test report, page 234.

n/a = not applicable

[1] For more information about all products in this table, circle reader service no. 910.
[2] Retested this month using PC WorldBench 98 test suite.
[3] The Gateway E-3110's score is extraordinarily high for the system's processor class. This score may drop, pending further investigation.

THIS MONTH, INTEL IS KING. The Pentium II CPU is at the heart of every system on the power chart, and only a single system—Gateway's G6-266—has a Pentium II with a clock that runs slower than 300 MHz. At the high end of the spectrum, four PII-333 midtowers are spread across the chart. NEC's pair of PII-333 PCs includes the PowerMate Enterprise 8000, a $2828 speed demon that received the highest-ever PC WorldBench 98 score for a system running Windows 95. Of the other two Pentium II-333 systems, one each comes from Dell and Hewlett-Packard. The Dell Dimension XPS D333 tops the chart, thanks to a substantial drop in price. HP's Vectra VL 7 tested well, but is pricey at $3030.

SCORECARD

★ Overall rating	PC WorldBench score/performance	Features and design	Vendor's system reliability	Price	Vendor's support quality/policies	Reader service number[1]
86	164/very good	very good	above average	average	above average/best	709
85	165/very good	very good	above average	average	above average/best	710
84	172/very good[3]	good	average	average	above average/best	711
83	152/good	very good	average	inexpensive	above average/best	712
83	151/good	outstanding	average	inexpensive	average/best	713
83	172/very good	good	average	average	above average/best	714
82	152/good	very good	[4]	very inexpensive	[4]/best	715
81	218/outstanding[5]	very good	average	average	average/poor	716
81	161/good	good	[4]	very inexpensive	[4]/best	717
81	162/good	very good	average	inexpensive	average/fair	718
80	144/good	good	above average	inexpensive	above average/best	719
80	169/very good	very good	below average	inexpensive	average/good	720
80	136/satisfactory	outstanding	average	inexpensive	average/best	721
80	213/outstanding[5]	very good	[4]	average	[4]/good	722
79	164/very good	very good	[4]	inexpensive	[4]/fair	723
79	175/outstanding	good	below average	average	average/good	724
78	159/good	very good	[4]	very inexpensive	[4]/good	725
78	163/good	good	[4]	very inexpensive	[4]/good	726
77	202/very good[5]	very good	average	very expensive	average/best	727
77	205/very good[5]	good	[4]	inexpensive	[4]/best	728
Scorecard weightings ▶	Performance 25 percent	Features 25 percent	Reliability 15 percent	Price 15 percent	Quality/policies 10 percent each	

[4] Insufficient data to give a rating.
[3] Tested with Windows NT 4.0.

This Month's Best Buys

1 DELL DIMENSION XPS D333

PRO: Includes 2X DVD-ROM and Zip drive

CON: Only Best Buy without a 19-inch monitor

The $2929 Dell Dimension XPS D333 is a fast, loaded machine that earns the number one spot on our power chart for the first time. Last month, the Dimension XPS D300 was a better buy, but a $270 price drop on the XPS D333 hands it the lead. The XPS D333 is only 4 percent faster than its near-twin, but after the price drop it costs only $80 more than the $2849 D300, making it a better buy.

The D333 has an impressive configuration, including a second-generation DVD-ROM drive. It sports an 8GB hard drive—one of the largest on the power chart. The 4MB STB Velocity 128 graphics adapter supports Accelerated Graphics Port texturing features that some AGP cards don't. This machine also includes two Microsoft applications: Office 97 Small Business Edition and either Bookshelf or Encarta. Our only gripe? The D333 is the only power Best Buy that doesn't come with a 19-inch monitor.

Dell Dimension XPS D333

The D333 is well marked for easy setup—the back ports have color coding and identification symbols. But the case is a challenge to open: The tabs that need to be pressed and pulled simultaneously in order to get inside the machine are hard to grip, so working the panel free is needlessly difficult. Inside, the modem and sound card take up both ISA slots, which leaves just two PCI slots free, limiting the unit's expandability.

Dell's documentation includes a foldout setup guide that gets the job done. The company's support policies are strong: Parts are covered for three years and labor for one, and toll-free phone support is available around the clock.

2 MICRON MILLENNIA XKU 300

PRO: Faster than the average PII-300, high-quality 19-inch monitor, Iomega Zip drive, great speakers

CON: Most expensive power Best Buy

Micron's Millennia XKU 300 has been in and out of Best Buy territory since we reviewed it last November. This month, yet another price cut reduces the system's price to $2998 and advances it one spot on our chart.

A no-holds-barred dream box for the small or home office, the XKU 300 hosts an array of luxurious components including a beautiful Hitachi 19-inch monitor that displays crisp and evenly focused text and graphics. Designed to entertain you as well, the XKU also comes with a Sound Blaster AWE64 card plus Cambridge ▶

Micron Millennia XKU 300

PHOTOGRAPHS: KEN SMITH

TOP 20 POWER DESKTOPS — STANDARD FEATURES

	SYSTEMS	CPU	Operating system	RAM (MB)	Secondary cache (KB)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	Modem speed (kbps)
1	Dell Dimension XPS D333*	Pentium II-333	Windows 95	64	512	8	ST8 Velocity 128 (AGP)	4/SGRAM	17/15.9	56 [2]
2	Micron Millennia XKU 300*	Pentium II-300	Windows 95	64	512	6.4	Diamond Viper V330 (AGP)	4/SGRAM	19/18	56 [2]
3	Gateway E-3110 300*	Pentium II-300	Windows 95	64	512	8.4	ATI Xpert@Work (AGP)	8/SGRAM	19/18	not included
4	Gateway G6-266*	Pentium II-266	Windows 95	64	512	4	ST8 Velocity 128 (AGP, OEM)	4/SGRAM	19/18	56 [2]
5	Quantex QP6/300 SM-4x*	Pentium II-300	Windows 95	64	512	6.4	Number Nine Revolution 3D	8/WRAM	19/17.9	56 [3]
6	Gateway G6-300	Pentium II-300	Windows 95	64	512	8	ST8 Velocity 128 (AGP, OEM)	4/SGRAM	19/18	56 [2]
7	Cybermax PowerMax 7	Pentium II-300	Windows 95	64	512	8.4	ST8 Velocity 128 (AGP)	4/SGRAM	17/16.1	56 [3]
8	HP Vectra VL 7	Pentium II-333	Windows NT 4.0	64	512	6.4	Matrox Millennium II	8/WRAM	17/15.9	not included
9	Micro Express MicroFlex-F300B	Pentium II-300	Windows 95	64	512	4	ATI Xpert@Work (AGP)	8/SGRAM	17/15.8	33.6
10	HP Brio PC	Pentium II-300	Windows 95	64	512	8	Matrox Millennium II (AGP)	4/WRAM	17/15.8	56 [2]
11	Dell Optiplex GXa 266	Pentium II-266	Windows 95	32	512	3.2	integrated ATI 3D Rage Pro	4/SGRAM	17/15.9	not included
12	NEC Direction SPL 333	Pentium II-333	Windows 95	64	512	6.4	Diamond Viper 330 (AGP)	4/SGRAM	17/16	56 [2]
13	Quantex QP6/300 SM-4xSE	Pentium II-300	Windows 95	32	512	6.4	Diamond Viper V330 (AGP)	4/SGRAM	19/17.9	56 [3]
14	Sys Technology Sys Performance Pro 300LA	Pentium II-300	Windows NT 4.0	64	512	6.4	Matrox Millennium II (AGP)	8/WRAM	17/15.7	56 [2]
15	Kingdom Pinnacle 300/P2	Pentium II-300	Windows 95	64	512	6.4	ATI Xpert@Work (AGP)	4/SGRAM	17/15.7	56 [2]
16	NEC PowerMate Enterprise 8000	Pentium II-333	Windows 95	64	512	6.4	ATI Xpert@Work (AGP)	8/SGRAM	17/16	not included
17	Polywell Poly 700L5 PII 300	Pentium II-300	Windows 95	64	512	7	Diamond Fire GL 1000 Pro	8/SGRAM	17/15.7	56 [3]
18	Vektron Super PowerStation PII-300	Pentium II-300	Windows 95	64	512	7	Matrox Millennium II (AGP)	4/WRAM	19/18	56 [2]
19	Compaq Deskpro 6000T	Pentium II-300	Windows NT 4.0	64	512	4.3	Matrox Millennium II (AGP)	4/WRAM	19/18	not included
20	Everex StepStation 2	Pentium II-300	Windows NT 4.0	64	512	8.4	FIC 3Dlabs (AGP)	8/SGRAM	17/16.1	not included

* Best Buy

[1] *PC World* defines towers as taller than 20 inches, midtowers as 15.5 inches to 20 inches, and minitowers as less than 15.5 inches.

[2] Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.

Soundworks speakers and subwoofer for excellent audio output.

Like more and more high-end PCs, the XKU includes a built-in Iomega Zip drive. You also get a good-size 6.4GB Ultra-DMA hard drive, a 14X–32X CD-ROM drive, and a fast 3Com/U.S. Robotics 56-kbps Sportster modem.

The XKU 300 also includes AGP graphics. Few AGP-compatible applications are available at this time, but at least the AGP bus (with its dedicated slot) frees up a PCI slot that would otherwise be used for a graphics card.

Micron's support policies are among the best around—parts are covered for three years and labor for one, and the company's free round-the-clock technical support is as good as it gets.

3 GATEWAY E-3110 300

PRO: Very fast, easy-to-remove chassis, bundled LAN adapter and client management software

CON: Midtower case's curved top makes stacking external components difficult, slow CD-ROM drive for a Best Buy system

With a stunning $241 price drop, the Gateway E-3110 300 captures a place in the Best Buy ranks. Powered by a Pentium II-300 CPU, this corporate midtower cranked out a PC WorldBench 98 score of 170, making it the fastest Best Buy this month. The E-3110 also comes with such corporate perks as an SMC EtherPower II 10/100 network interface card for an easy high-speed network connection, and DMI-2 client management software that lets LAN administrators access the machine without leaving their own desks.

Gateway E-3110 300

At $2748, the E-3110 300 comes well configured, from its 64MB of SGRAM and 512K of secondary cache to its roomy 19-inch monitor. The Gateway EV900 monitor is more screen than you'll ever need for your average office tasks, but it's great for high-end graphics work. Gateway also throws in some tidbits that many corporate systems lack, such as an Ensoniq AudioPCI sound card and reasonably good-sounding Altec Lansing ACS41 speakers. The system doesn't come with a modem, but with its ethernet capabilities, you prob-

		EXPANDABILITY					CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	Sound board	Case style [1]	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
2X DVD-ROM	Sound Blaster AWE64	midtower	384	1	3/1	2	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	Sound Blaster AWE64	midtower	384	2	2/1	3	3/1	24	Sat., Sun.	BBS, CIS, WWW
13X-32X	Ensoniq Audio PCI	midtower	384	2	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
13X-32X	Ensoniq Audio PCI	midtower	384	2	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	Ensoniq Audio PCI	midtower	512	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
2X DVD-ROM	Ensoniq Audio PCI	tower	384	2	3/7	1	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	Ensoniq Audio PCI	midtower	512	2	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
12X-24X	Aztech AZT2320	midtower	384	2	2/1	4	3/3	11	none	AOL, BBS, CIS, WWW
2X DVD-ROM	Super Sound32 32W-3D	midtower	512	2	3/0	4	4/4	24	Sat., Sun.	WWW
14X-32X	HP Audio Device (AZT 100B)	midtower	192	2	2/1	3	3/3	16	Sat.	AOL, CIS, WWW
12X-24X	integrated Crystal PnP	midtower	384	2	2/1	7	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-24X	integrated Yamaha YMF715	midtower	384	1	3/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
2X DVD-ROM	Ensoniq Audio PCI	midtower	512	3	3/3	4	3/1	24	Sat., Sun.	BBS, WWW
12X-24X	Sound Blaster AWE64	midtower	1024	2	3/2	4	varies [4]/5	24	Sat., Sun.	WWW
12X-24X	Ensoniq Audio PCI	midtower	512	3	3/2	4	varies [5]/1	15.5	Sat.	WWW
12X-24X	integrated Yamaha OPL3-Sax	midtower	384	2	2/1	5	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-24X	Yamaha OPL3-Sax	midtower	1024	3	3/0	3	3/5	10	Sat.	WWW
14X-32X	integrated	midtower	768	2	3/0	4	3/1	24	Sat., Sun.	WWW
12X-24X	ESS ES1B69 Audio Drive	midtower	384	1	2/0	6	3/1	24	Sat., Sun.	AOL, BBS, CIS, WWW
14X-32X	ESS Sound Conductor 16 PnP	midtower	384	2	3/1	4	3/3	24	Sat., Sun.	BBS, WWW

[3] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.
[4] Six years on CPU and main RAM, one to five years on other parts.
[5] Five years on CPU and main RAM, three years on other parts.

ably won't miss that feature much at all.

As with other Gateway computers, color-coded cables and ports make attaching peripherals easy. You don't need a screwdriver to remove the cover. Just twist off two large screws with your fingers and slide back the side panel to reveal the orderly interior. Gateway's support quality is above average, and its support policies are among the best; they include a three-year parts and labor warranty and tech support around the clock.

4 GATEWAY G6-266

PRO: Good performance, high-quality components, big monitor

CON: Curved top of midtower case makes it hard to stack peripherals, slow CD-ROM drive for a Best Buy system, expensive for a Pentium II-266

This month, the Gateway G6-266 slips to fourth place on our power chart. Even with a $211 drop, its $2550 price is higher than that of any other PII-266 machine we've tested. Overall, though, it's a good corporate PC with solid components and performance.

This fast Pentium II-266 midtower is fairly well outfitted. It has a 56-kbps modem, but its 4GB hard drive is smallish for a Best Buy. The STB Velocity 128 video card is one of the better AGP boards, and the Ensoniq Audio PCI wavetable card and Boston Acoustic satellite speakers with subwoofer provide terrific sound.

Nifty design touches enhance the G6-266. The sides and top of the light-gray case curve subtly outward, but the arched top means you can't place external peripherals or disks there. We also found the case simple to open.

The G6-266's keyboard is also distinctive, with special buttons at the top that let you adjust the sound level as well as control audio CDs and even a TV or radio if you connect the system to a home entertainment center.

Gateway G6-266

Gateway's documentation is laudable: It offers concise, informative help. The company also has excellent support policies, including a three-year warranty on parts and labor and 24-hour toll-free tech support. Our readers have rated Gateway's support quality above average. ▶

5 QUANTEX QP6/300 SM-4X

PRO: Big price drop, good video card

CON: Blurry monitor

If you want your PC to move so fast you feel the wind in your face, you'll probably skip the Quantex QP6/300 SM-4x: Faster machines are definitely available. Still, the SM-4x's CPU is a Pentium II-300. If you're upgrading from a Pentium-75, you'll be plenty happy with the speed increase. And with a monumental price drop of $450, this machine's $2549 price tag makes it a particularly attractive buy.

The QP6/300 SM-4x offers some notable components: Home users will appreciate the Ensoniq AudioPCI sound board, which provides impressive playback under Windows 95. The 8MB Number Nine Revolution 3D video adapter ports images to the huge 19-inch monitor—but the display's blurry output disappointed us.

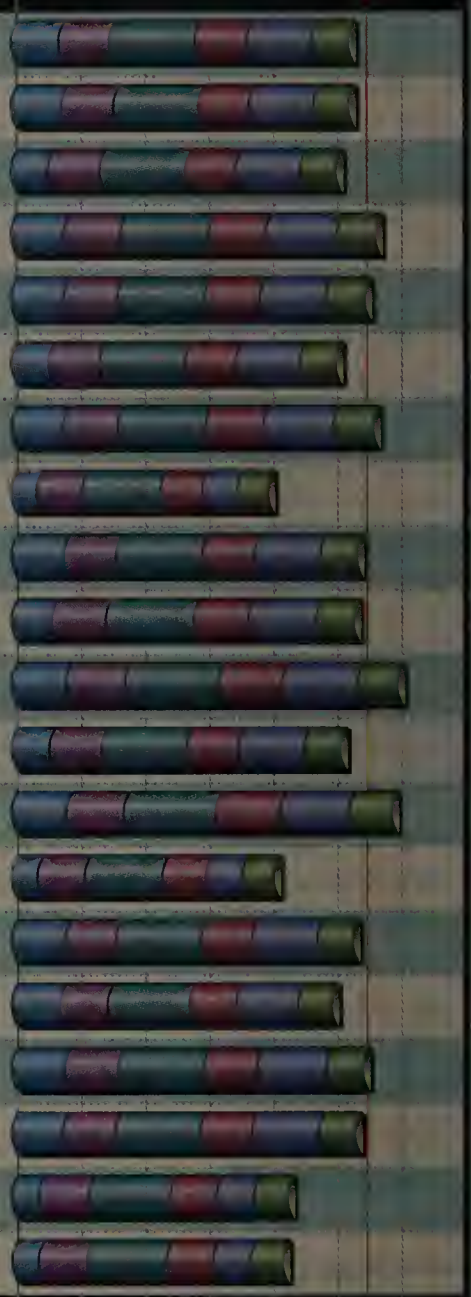
Quantex QP6/300 SM-4x

Though the reliability of Quantex machines is only average, support policies get our best ratings. Nonetheless, in our anonymous calls to tech support, we had to wait on hold for up to 45 minutes before we spoke to someone. ▶

TOP 20 POWER DESKTOPS

TEST REPORT

	SYSTEMS	CPU	Operating system	RAM (MB)	Secondary cache (KB)	PC WorldBench score
1	Dell Dimension XPS D333*	Pentium II-333	Windows 95	64	512	164
2	Micron Millennia XKU 300*	Pentium II-300	Windows 95	64	512	165
3	Gateway E-3110 300*[2]	Pentium II-300	Windows 95	64	512	172
4	Gateway G6-266*	Pentium II-266	Windows 95	64	512	152
5	Quantex QP6/300 SM-4x*	Pentium II-300	Windows 95	64	512	151
6	Gateway G6-300	Pentium II-300	Windows 95	64	512	172
7	Cybermax PowerMax 7	Pentium II-300	Windows 95	64	512	152
8	HP Vectra VL 7	Pentium II-333	Windows NT 4.0	64	512	218
9	Micro Express MicroFlex-F300B	Pentium II-300	Windows 95	64	512	161
10	HP Brio PC	Pentium II-300	Windows 95	64	512	162
11	Dell Optiplex GXa 266	Pentium II-266	Windows 95	32	512	144
12	NEC Direction SPL 333	Pentium II-333	Windows 95	64	512	169
13	Quantex QP6/300 SM-4xSE	Pentium II-300	Windows 95	32	512	136
14	Sys Technology Sys Performance Pro 300LA	Pentium II-300	Windows NT 4.0	64	512	213
15	Kingdom Pinnacle 300/P2	Pentium II-300	Windows 95	64	512	164
16	NEC PowerMate Enterprise 8000	Pentium II-333	Windows 95	64	512	175
17	Polywell Poly 700L5 PII 300	Pentium II-300	Windows 95	64	512	159
18	Vektron Super PowerStation PII-300	Pentium II-300	Windows 95	64	512	163
19	Compaq Deskpro 6000T	Pentium II-300	Windows NT 4.0	64	512	202
20	Everex StepStation 2	Pentium II-300	Windows NT 4.0	64	512	205

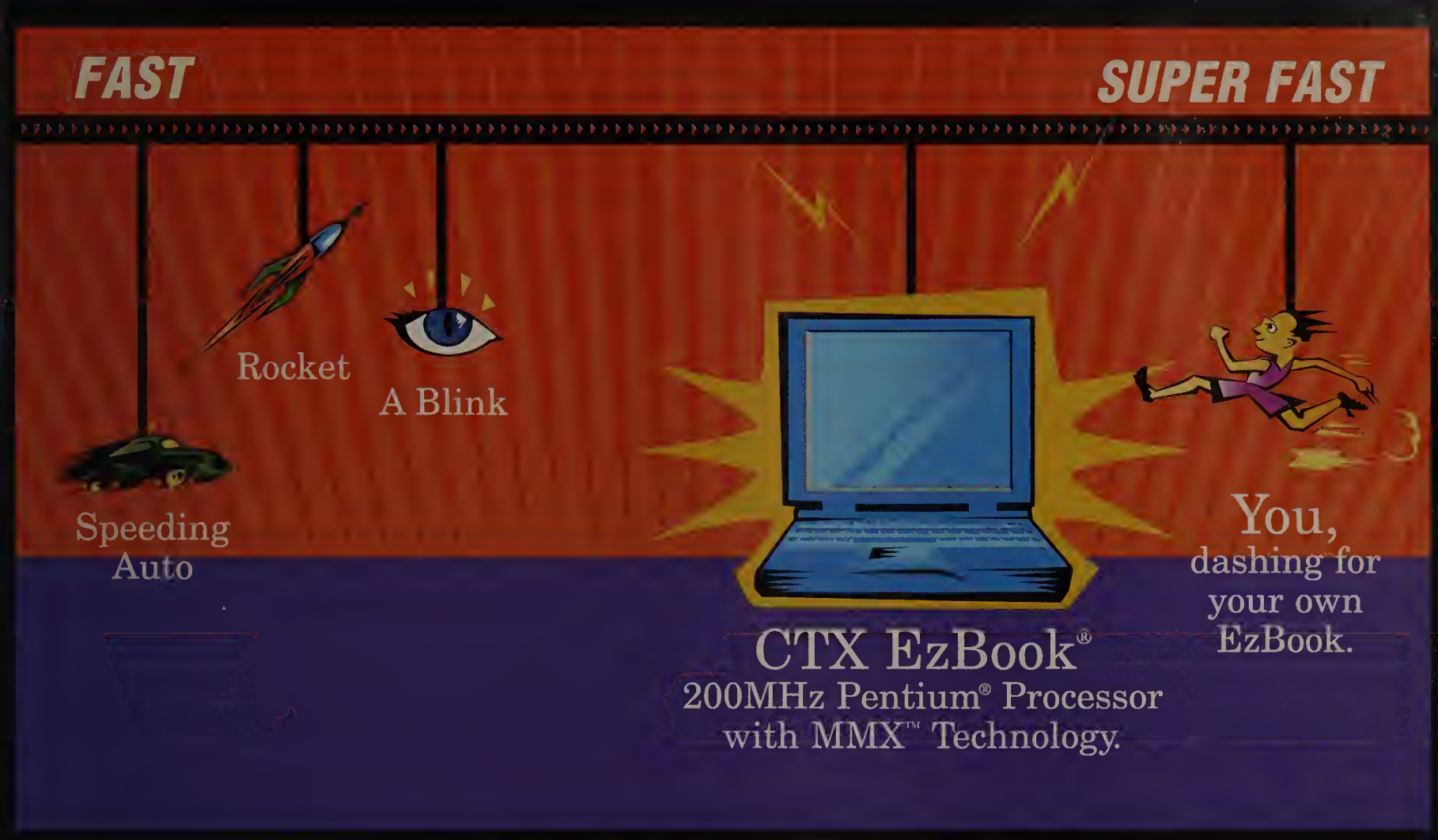


*Best Buy

Word 97 · Excel 97 · Picture Publisher 7.0 · Paradox 8.0 · Word Pro 97 · 1-2-3 97

HOW WE TEST All systems are tested with PC WorldBench 9B, *PC World's* application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with either Windows 95 or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 9B score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Excel 97 (20 percent), Picture Publisher 7.0 (20 percent), Paradox 8.0 (20 percent), Word Pro 97 (10 percent), and 1-2-3 97 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/benchmark).

[1]Under Windows 95. [2]The Gateway E-3110's score is extraordinarily high for its processor class. It may drop to a lower score pending further investigation.



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PC WORLD BEST BUY For the EzBook 764MT October 97

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PC WORLD BEST BUY For the EzBook 750MS November 97

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Circle 64 on reader service card

New This Month

The following PCs made our power desktops chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

8 HP VECTRA VL 7

PRO: Fastest performance among Windows NT-based systems

CON: No network card, pricey

If you're willing to pay any price for speed, the $3030 HP Vectra VL 7 has your name on it. Running Windows NT, the Vectra VL 7 earned a PC WorldBench 98 score of 218, becoming the fastest machine we've ever tested. Its speed, along with a solid configuration, put it on our list despite its high price.

HP Vectra VL 7

The Vectra VL 7 is a good corporate machine. First and foremost, upgrading it is easy. Its quick-release case permits simple opening, once you figure out how it works. The Vectra VL 7 also incorporates important manageability features that allow an IS department to access the machine remotely. Surprisingly, since it's a corporate machine, our review unit didn't come with a network interface card; but that component costs only $90 so, you might want to add it yourself.

HP's support plan for Vectras lacks weekend hours, but in our anonymous calls, technicians answered the phone quickly and were helpful.

9 MICRO EXPRESS MICROFLEX-F300B

PRO: Good price, DVD drive, easy to add peripherals and memory, excellent support policies

CON: Skimpy hard disk and modem

People looking for hard-core processing power at a good price will find Micro Express's $2299 MicroFlex-F300B a comfortable fit.

MicroFlex-F300B

The generic tan chassis of the F300B houses a powerful Pentium II-300 processor that cranks out a PC WorldBench 98 score of 161—fast for a system in this class. But if you're looking for all the extras, this stripped-down speedster isn't your dream machine: The 33.6-kbps modem and 4GB Quantum Fireball hard drive are skimpy for a PII-300 machine.

The MicroFlex-F300B does weigh in heavily with multimedia features, though. The ATI Xpert@Work video board is a good AGP card. The Mli-818 Super 3D speakers deliver powerful stereo, and the system includes a DVD-ROM drive.

The MicroFlex-F300B's expandability also wins kudos. Inside, you'll find three drive bays, four slots, and two DIMM sockets free. The F300B also has SCSI capabilities built into the system board, so you won't have to add a SCSI card to upgrade your hard drive.

The company offers one of the best support plans around. However, we were somewhat disappointed with the quality of the support when we made our anonymous calls: The technicians were helpful, but rather abrupt.

10 HP BRIO PC

PRO: Good price, big hard drive, fast CD-ROM drive

CON: Support policies only so-so, keyboard requires heavy touch, thin software bundle, case cover tough to reclose

The $2517 Brio PC takes aim at the home-office market and hits the mark—partly. It's as solid as a tank. The documentation—both printed and accessible on screen—is very much geared toward beginners: It's well illustrated and written in plain language. This 300-MHz Pentium-II midtower is a tad pokey for a CPU in its class, but the Brio still performs creditably for a high-end system, and it has an attractive price.

HP Brio PC

Nonetheless, Hewlett-Packard's latest has enough drawbacks to keep it well away from achieving a Best Buy. Most unsatisfactory is the keyboard. At first scan we really liked its nifty dedicated keys for one-touch access to e-mail, the Web, and other applications you assign. But using it is difficult: You have to press so hard, yur typin might strt lookng lke ths.

We liked what we saw inside—the Brio has a very clean interior—but fitting the cover back on can take some finagling. Perhaps most important, HP's support needs an upgrade. The company offers only 16 hours per day during the week, and only 7 hours on Saturday—and these days around-the-clock support is practically de rigueur for our top-ranked PCs.

16 NEC POWERMATE ENTERPRISE 8000

PRO: Fast, easy setup, good support policies

CON: No modem, awkward internal design

When you're in charge of managing your company's PCs, you can't waste precious hours fiddling with system setup. The NEC PowerMate Enterprise 8000 is designed to help you get up and running fast—and save some dollars. Granted, $2818 is not what you'd call cheap, but it is a good price for a Pentium II-333 machine.

Enterprise 8000

The unit has 10/100MB ethernet integrated onto the motherboard, so the system is ready to network right out of the box. The color-coded connectors for both the NEC natural keyboard (which has an optional wrist rest) and the Microsoft IntelliMouse make them easy to plug in—a small detail that saves time. Finally, the Enterprise 8000 comes preinstalled with LANDesk Client Manager, allowing your IS department to manage the PC over the network.

With a PC WorldBench 98 score of 175, this Pentium II-333 is the fastest Windows 95 machine we've tested. It also comes with one of the best AGP graphics cards we've seen (the ATI Xpert@Work, with 8MB of SGRAM). The NEC C700 17-inch monitor has an unusually large 16-inch viewable area.

We have two complaints about the Enterprise 8000. First, it lacks a modem, though this may not be a problem if you use the PC in a networked corporation. Second, its interior design is poorly ▶

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conceived: We had to turn the wide midtower on its side so we could access the cramped drive compartments and drive bays more easily.

The Enterprise 8000 is backed by toll-free round-the-clock service and a three-year parts and labor warranty. In our fax-back survey, readers rated NEC's support quality as average; but in our anonymous calls we didn't fare quite as well: The reps' advice wasn't detailed enough.

17 POLYWELL POLY 700L5 PII 300

PRO: Well priced for a PII-300, good expandability

CON: Difficult monitor controls, poor-quality speakers

The Polywell Poly 700L5 PII 300 is nothing much to look at—just a standard, dark-gray, button-down machine. But it offers high-grade components and decent expandability at a reasonable price. The $2350 Polywell Poly 700L5 costs almost $200 less than similarly configured Pentium II-300 machines.

Polywell Poly 700L5

Inside the L5 you'll find generous components—a 7GB Maxtor hard drive and 64MB of memory. If you get RAM-hungry, you can even upgrade to a full *gigabyte* of system memory. Polywell did cut corners on video, however: The L5 includes an AGP slot on the motherboard, but the system comes with a PCI graphics card.

Other components are unimpressive. The Sampo AlphaScan KM-711 17-inch monitor that came with our test system was sharp, but you'll need the manual to figure out how to use its controls. The SoundForce 600 speakers have little but volume to offer, and the keyboard is on the flimsy side.

Compaq Deskpro 6000T

Polywell offers 10 hours of toll-free tech support weekdays, which should be fine for the average business user. Unfortunately, the company's service isn't quite up to par. When we made anonymous calls for technical support, we had to leave several messages before we received a return call.

19 COMPAQ DESKPRO 6000T

PRO: Very easy to maintain and upgrade, big monitor, very good support policies

CON: Extremely pricey

This Deskpro comes with everything a system administrator could desire in a corporate workstation—excluding the stiff $4000 price. With its low-profile speakers and quiet, sturdy keyboard, the 6000T makes a great multimedia system for the corporate setting, and it's one of the easiest midtowers to manage and upgrade we've ever seen. Still, the 6000T nearly didn't make the power chart at all. It's fast for its processor class, but it costs $1300 more than the average Pentium II-300 PC on the chart, and it doesn't even come with any applications.

If budget is no object, the 6000T is perfect for IS departments that need to manage a large number of workstations efficiently. Undoing a few screws by hand and popping the side cover off, we got inside the Deskpro in about 30 seconds. The expansion slots are on a large removable cartridge, which we pulled out with a little tug, obtaining complete access to all slots. Processor, drive bays, and memory sockets are readily accessible, too. Even the motherboard slides out easily after you detach the power and disk drive cables from it.

This Windows NT 4.0–based system contains DMI software to help the administrator remotely manage the system's assets—for example, it tracks the names and serial numbers of the PC's monitor and hard drive—and it includes an exhaustive diagnostic utility. Compaq also provides excellent documentation. The quick setup guide diagrams how to connect all the peripherals to the computer, and the reference manual is well illustrated and easy to read.

Compaq rounds out the package with excellent support policies. The company covers parts for three years and labor for one, and technicians are available around the clock. Tech support does a good job, judging by our readers' generally positive feedback and our own experience. In our anonymous calls to support, we had to wait on hold for about 10 minutes; but once we reached someone, we got thorough, accurate responses to our questions.

20 EVEREX STEPSTATION 2 PII 300

PRO: Very good performance, crisp monitor with easy controls, good support plan

CON: Plain, difficult access to interior

The Everex StepStation 2 PII 300 makes sense for companies looking to stock up on fast workhorse machines that don't cost an arm and a leg. This $2550 Pentium II-300 Windows NT powerhouse earned a PC WorldBench 98 score of 205—above average for machines in its class. Each unit comes with a network interface card to make corporate setup a step easier.

Everex StepStation 2

Just don't expect glamour. Visually, the StepStation is a plain-Jane, putty-colored midtower, as sturdy as it is dour. But its plain exterior hides some exciting components: a hefty 8.4GB hard drive and a cutting-edge 14X–32X CD-ROM drive.

To get inside the system, we had to use a screwdriver to remove six screws, each small enough to misplace easily. And replacing the chassis was a frustrating affair: We had to line up the case just so to make it fit.

Everex has first-rate support policies—in addition to a three-year warranty for parts and labor, it offers 24-hour toll-free support. In our anonymous calls to the company's tech lines, we weren't on hold long, but responses varied in accuracy. ▶

Beyond the Top 20: Online

We evaluated the following systems along with the others, but they didn't score high enough to reach the Top 20 Power Desktops chart. For write-ups, see PC World Online (www.pcworld.com/t20pcs).

- **DTK APRI-76M/P300**
- **Compaq Deskpro 2000 6300X**
- **Micron Millennia XKU 333**
- **NexTrend NexStar-600**
- **Nova PII-300**
- **ProGen Polaris II-333**
- **Quantex QP6/300 SB-4x**

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PC WORLD

TOP 20 BUDGET DESKTOPS

	SYSTEMS	Last month	Month tested	Street price (2/11/98)	CPU	Comments
1	Gateway G6-266b 800/846-2000 www.gateway.com	n/a	NEW	$1939	Pentium II-266	Fast and nicely priced home-office machine, top-notch support policies.
2	Gateway E-3110 266 800/779-2000 www.gateway.com	n/a	retested [2]	$2118	Pentium II-266	$231 price drop on corporate Pentium II-266; small hard drive.
3	Dell Dimension XPS D266 800/388-8542 www.dell.com	1	retested [2]	$2199	Pentium II-266	$30 price drop on former first-place machine, includes AGP graphics and Office 97.
4	Quantex QP6/266 WS-3x 800/896-4898 www.quantex.com	n/a	NEW	$1999	Pentium II-266	Corporate machine with good support policies; lacks a sound card.
5	NEC Direction 266L 888/863-2669 www.necnow.com	n/a	NEW	$1699	Pentium II-266	Cheapest Best Buy has good performance but small monitor.
6	Polywell Poly K6266MX 800/999-1278 www.polywell.com	n/a	NEW	$1950	AMD K6-266	AMD K6 machine has decent performance, good expandability; poor support.
7	Micron Millennia Mme 888/634-8799 www.micronpc.com	n/a	retested [2]	$1955	Pentium MMX-200	New configuration on speedy multimedia machine with 17-inch monitor.
8	Everex AGI MMX 233 800/821-0806 www.everex.com	n/a	NEW	$1180	Pentium MMX-233	Cheapest PC on chart is fast; good support policies, but system quality could be better.
9	Gateway GP5-233 800/846-2000 www.gateway.com	3	retested [2]	$1868	Pentium MMX-233	Fast and loaded Pentium MMX-233 multimedia system with 56-kbps modem.
10	Unicent Avanta L233 800/308-3614 www.unicent.com	8	retested [2]	$1799	Pentium II-233	$100 price drop on well-configured Pentium II-233.
11	Quantex QP5/200 SM-1 800/896-4898 www.quantex.com	9	retested [2]	$1349	Pentium MMX-200	Affordable multimedia PC has great support policies but poor performance.
12	Unicent Avanta T233 800/308-3614 www.unicent.com	4	retested [2]	$1799	Pentium MMX-233	$50 price drop on fast multimedia machine; support quality needs improvement.
13	Kingdom Pinnacle M200+ V 800/385-3436 www.kingdomcomputers.com	16	retested [2]	$1197	Cx6x86MX-PR200	Very inexpensive system; weak support policies.
14	Xi Computer Xi K200 MTower 800/432-0486 www.xicomputer.com	n/a	retested [2]	$1749	AMD K6-200	Midtower comes with 17-inch monitor; skimpy modem.
15	Dell Optiplex Gn+ 233 800/289-3355 www.dell.com	11	retested [2]	$1745	Pentium MMX-233	Well-designed corporate desktop, $24 price cut; no free drive bays.
16	Micro Express MicroFlex-F225K 800/989-9900 www.microexpress.net	7	retested [2]	$1349	AMD K6-233	Bargain speedster with PC-to-TV graphics card, great warranty.
17	Sys Technology Sys Performance 233K6 800/613-9963 www.systechnology.com	14	retested [2]	$2193	AMD K6-233	Nicely designed machine comes with good support policies.
18	Polywell Poly K6233MX 800/999-1278 www.polywell.com	n/a	retested [2]	$1575	AMD K6-233	Quick and well-configured system has large hard drive.
19	Micron ClientPro MRE 888/634-8799 www.micronpc.com	20	retested [2]	$1758	Pentium MMX-233	$91 price drop on network-ready midtower with great support.
20	Diamond K6-200 800/989-7253 www.diamondtech.com	n/a	retested [2]	$1475	AMD K6-200	Low-priced machine comes with good graphics card, 56-kbps modem.

Best Buy See features chart, page 242; test report, page 244.

n/a = not applicable

[1] For more information about all products in this table, circle reader service no. 911.
[2] Retested this month using PC WorldBench 98 test suite.
[3] Tested with Windows NT 4.0.
[4] Insufficient data to give a rating.

INTEL'S PENTIUM II-266 CPU powers all five Best Buy systems this month, Pentium-MMX systems slide toward the bottom of the chart, and the middle ranks are populated by medium- to low-price machines with Advanced Micro Devices' K6 chip. The top score for a Windows 95 PC goes to Gateway's PII-266–powered E-3110 266, but even a steep price cut couldn't push it to first place. The highest-ranking K6 machine is Polywell's $1950 Poly K6266MX, in sixth place. With the fastest AMD processor on the chart, the Poly is even speedier than the Best Buy Dell Dimension XPS D266. So why doesn't it capture Best Buy status? Polywell offers subpar support hours, and the machine has some poor components.

SCORECARD

★ Overall rating	Features and design	Price	PC WorldBench score/performance	Vendor's system reliability	Vendor's support quality/policies	Reader service number[1]
87	very good	average	144/outstanding	average	above average/best	729
85	good	average	152/outstanding	average	above average/best	730
83	good	expensive	142/outstanding	above average	above average/best	731
80	satisfactory	average	189[3]/outstanding	average	average/best	732
80	good	average	156/outstanding	below average	below average/good	733
80	very good	average	145/outstanding	[4]	[4]/good	734
79	good	average	115/good	above average	above average/best	735
78	satisfactory	very inexpensive	119/good	[4]	[4]/best	736
78	good	average	118/good	average	above average/best	737
77	good	average	135/very good	[4]	[4]/best	738
77	good	inexpensive	96/poor	average	average/best	739
76	good	average	122/good	[4]	[4]/best	740
76	good	very inexpensive	122/good	[4]	[4]/fair	741
76	good	average	117/good	[4]	[4]/best	742
76	satisfactory	average	113/good	above average	above average/best	743
75	satisfactory	inexpensive	128/good	[4]	[4]/best	744
74	very good	expensive	133/very good	[4]	[4]/good	745
74	good	inexpensive	121/good	[4]	[3]/good	746
73	satisfactory	average	143[3]/satisfactory	above average	above average/best	747
71	good	inexpensive	118/good	[4]	[3]/poor	748
Scorecard weightings ▶	Features 25 percent	Price 22 percent	Performance 18 percent	Reliability 15 percent	Quality/policies 10 percent each	

This Month's Best Buys

1 GATEWAY 2000 G6-266B

PRO: Terrific performance, inexpensive for a 266-MHz Pentium II PC, very good support

CON: Cryptic port labels, rounded case top

Looking for a fast, decked-out home-office PC that doesn't cost a bundle? Gateway's new G6-266b is the best sub-$2000 system we've seen.

On the whole, this PC is a terrific deal. Aside from the fifth-place $1699 NEC Direction 266L, the $1939 G6-266b is the cheapest PII-266 we've tested, and it performs well for its CPU class. It's also well appointed for a low-cost PC and has some above-average components, including a 13X–32X CD-ROM drive and an exceptionally sharp 17-inch Gateway EV700 monitor. The G6-266b even looks better than most PCs. The near–full-tower case bows gently outward in the middle, and an easy-to-remove curved front panel covers the drive-bay panels, all lending this PC a smooth, contoured look. But convenience is sacrificed to style: The convex top panel makes putting stuff on top of it an exercise in futility—general home-office paraphernalia such as a stack of CD-ROMs slides right off.

Gateway G6-266b

Still, home-office users will appreciate the extra mile Gateway went to minimize hassles. The G6-266b's serial number is conveniently located behind the removable front panel, making it easily accessible for support calls. If you need to get inside the case, that's easy too. You'll find a tidy interior with convenient access to all expansion slots, memory sockets, and drive bays. Our one complaint: Some of the rear ports are labeled with confusing icons; for example, the serial ports are labeled with ones and zeroes.

The mainstays of a top-notch home-office PC are good support and reliability, and Gateway offers both. The company's excellent policies include a three-year warranty for labor and parts, plus round-the-clock technical support. According to our readers, Gateway builds generally reliable PCs and provides above-average support for them.

2 GATEWAY E-3110 266

PRO: Very fast PII-266 comes with LAN adapter and DMI-2 client management software

CON: Curved case design makes stacking external components on top impossible

A substantial $231 price drop pulls the Gateway E-3110 266 into a second-place Best Buy position this month. Powered by a Pentium II-266 CPU, the E-3110 266 cranked out the second highest PC WorldBench 98 score among the Best Buy budget ▶

Gateway E-3110 266

PHOTOGRAPHS: KEN SMITH

TOP 20 BUDGET DESKTOPS — STANDARD FEATURES

	SYSTEMS	CPU	Operating system	RAM (MB)	Secondary cache (KB)	Hard drive (GB)	Graphics adapter	Video RAM (MB/type)	Monitor tube/viewable diagonal (inches)	Modem speed (kbps)
1	Gateway G6-266b*	Pentium II-266	Windows 95	32	512	4.6	ST8 Velocity 128 (AGP, OEM)	4/SGRAM	17/16	56 [2]
2	Gateway E-3110 266*	Pentium II-266	Windows 95	64	512	4	ATI Xpert@Work	8/SGRAM	17/16.1	not included
3	Dell Dimension XPS D266*	Pentium II-266	Windows 95	32	512	4	ST8 Velocity 128 (AGP)	4/SGRAM	17/15.8	56 [2]
4	Quantex QP6/266 WS-3x*	Pentium II-266	Windows NT 4.0	64	512	6.4	Diamond Viper V330 (AGP)	4/SGRAM	17/16.1	56 [3]
5	NEC Direction 266L*	Pentium II-266	Windows 95	64	512	4.3	Number Nine 9FX Reality 334 (AGP)	4/SGRAM	15/13.9	56 [2]
6	Polywell Poly K6266MX	AMD K6-266	Windows 95	64	512	7	Diamond Stealth 3D 2000 Pro	4/EDO DRAM	17/15.8	56 [3]
7	Micron Millennia Mme	Pentium MMX-200	Windows 95	32	512	3.2	Diamond Stealth 3D 2000 Pro	4/EDO DRAM	17/16	56 [2]
8	Everex AGI MMX 233	Pentium MMX-233	Windows 95	32	1024	3.2	Diamond Stealth 3D 2000 Pro	2/EDO DRAM	15/13.6	56 [3]
9	Gateway GP5-233	Pentium MMX-233	Windows 95	32	512	2	ST8 Nitro 3D/GX	4/EDO DRAM	17/15.9	56 [2]
10	Unicent Avanta L233	Pentium II-233	Windows 95	32	512	4.3	Matrox Mystique	4/SGRAM	17/15.5	56 [2]
11	Quantex QP5/200 SM-1	Pentium MMX-200	Windows 95	32	512	4.3	ST8 Nitro 3D/GX	4/DRAM	15/13.9	56 [3]
12	Unicent Avanta T233	Pentium MMX-233	Windows 95	64	512	4.3	Matrox Millennium II	4/WRAM	17/15.8	56 [2]
13	Kingdom Pinnacle M200+ V	Cx6x86MX-PR200	Windows 95	32	512	3.5	Hercules Terminator 3D/DX	4/EDO DRAM	15/13.9	56 [2]
14	Xi Computer Xi K200 MTower	AMD K6-200	Windows 95	32	512	4.3	Number Nine Revolution 3D	8/WRAM	17/15.9	33.6
15	Dell Optiplex Gn+ 233	Pentium MMX-233	Windows 95	32	512	3.2	integrated S3 Trio 64V2/GX	2/EDO DRAM	15/13.9	not included
16	Micro Express MicroFlex-F225K	AMD K6-233	Windows 95	32	512	4	ATI 3D Pro Turbo PC2TV	4/WRAM	17/15.7	56 [3]
17	Sys Technology Sys Performance 233K6	AMD K6-233	Windows 95	32	512	6.4	Number Nine Revolution 3D	8/WRAM	17/15.8	56 [2]
18	Polywell Poly K6233MX	AMD K6-233	Windows 95	32	512	5.1	Diamond Stealth 3D 2000 Pro	4/EDO DRAM	17/15.8	33.6
19	Micron ClientPro MRE	Pentium MMX-233	Windows NT 4.0	32	512	3.2	Diamond Stealth 3D 2000 Pro	4/EDO DRAM	15/13.7	not included
20	Diamond K6-200	AMD K6-200	Windows 95	32	512	3	ATI Xpert@Play	8/SGRAM	17/15.7	56 [2]

* Best Buy

[1] *PC World* defines towers as taller than 20 inches, midtowers as 15.5 inches to 20 inches, and minitowers as less than 15.5 inches.

[2] Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.

desktop PCs running Windows 95. Like its 300-MHz sibling (a good performer in our benchmark tests), this machine rates as a strong, high-performance competitor in the corporate PC arena. It's about 7 percent slower than the E-3110 300, but at $2118 the E-3110 266 is 22 percent cheaper.

The system comes with an SMC EtherPower II 10/100 network interface card for an easy high-speed network connection, and DMI-2 client management software for LAN managers. The networking hardware and software bundled with the E-3110 266 let LAN administrators perform software upgrades and monitor systems without leaving their desks.

The EV700 monitor provides acceptable display quality for normal business use. If you do high-end graphics work—or work with ultrasmall fonts in word processing files and spreadsheets—consider spending $100 more for the better-quality Vivitron 700 17-inch monitor.

Gateway's three-year parts and labor warranty is among the best, and you get 24-hour phone support. But chances are you won't need to use it: Gateway systems rank among the most reliable, according to our readers.

3 DELL DIMENSION XPS D266

PRO: Outstanding budget performance, multimedia features, excellent support policies

CON: No free ISA expansion slots, expensive for a Budget Best Buy

For the third month running, you'll find Dell's wunderkind Dimension XPS D266 lounging in the Best Buy section of the Top 20 budget chart. Gateway's newest model, the G6-266b, has pushed the Dell out of first place, and a significant price drop on Gateway's E-3110 266, the number two Best Buy, makes the Dell the most costly Best Buy of the month. Still, a combination of strong performance and Dell's great service and reliability record helps preserve the machine's status as a Best Buy.

Dell Dimension XPS D266

The XPS D266's features are impressive. A 4MB STB Velocity 128 AGP graphics card is well paired with the 17-inch Dell 1000HS monitor. The Altec Lansing

		EXPANDABILITY					CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	Sound board	Case style[1]	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
13X-32X	Ensoniq Audio PCI	midtower	384	2	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
13X-32X	Ensoniq Audio PCI	midtower	384	2	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	Sound Blaster AWE64	midtower	384	2	3/1	3	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-24X	none	midtower	512	2	3/3	5	3/1	24	Sat., Sun.	BBS, WWW
12X-24X	integrated Yamaha OPL3-Sax	midtower	384	1	3/1	4	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-24X	CS37-3DIS	midtower	256	4	3/0	4	3/5	10	Sat.	WWW
12X-24X	Sound Blaster AWE64	midtower	256	1	2/1	3	3/1	24	Sat., Sun.	BBS, CIS, WWW
12X-24X	ESS ES1B6B	midtower	512	4	2/1	3	1/1	24	Sat., Sun.	BBS, WWW
13X-32X	Ensoniq Audio PCI	midtower	256	1	3/2	3	3/3	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
14X-32X	Ensoniq Audio PCI	midtower	384	3	3/0	3	5/3	24	Sat., Sun.	BBS, WWW
12X-24X	Ensoniq Audio PCI	midtower	256	4	3/2	4	3/1	24	Sat., Sun.	BBS, WWW
14X-32X	Ensoniq Audio PCI	midtower	256	1	3/0	3	5/3	24	Sat., Sun.	BBS, WWW
12X-24X	Ensoniq Audio PCI	midtower	256	2	3/2	3	varies[4]/1	15.5	Sat.	WWW
13X-24X	OEM Yamaha 718/719	minitower	256	5	3/0	4	3/3	24	Sat., Sun.	WWW
12X-24X	Creative Labs CT 41B0	desktop	256	1	0/0	2	3/1	24	Sat., Sun.	AOL, BBS, CIS, MSN, WWW
12X-24X	Sound Blaster AWE64	midtower	256	2	2/0	0	4/4	24	Sat., Sun.	WWW
12X-24X	Sound Blaster AWE64	midtower	256	5	3/2	4	varies[5]/5	24	Sat., Sun.	WWW
12X-24X	CS37W-3DIS	midtower	256	4	3/2	3	3/5	10	Sat.	WWW
12X-24X	Sound Blaster 16 PnP	midtower	256	1	2/1	3	3/1	24	Sat., Sun.	BBS, CIS, WWW
12X-24X	Crystal Wave 32AW-3D	desktop	256	4	2/0	3	3/3	9	none	AOL, BBS, CIS, MSN, WWW

[1] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.
[4] Five years on CPU and main RAM, three years on other parts.
[5] Six years on CPU and main RAM, one to five years on other parts.

ACS-290 speakers and subwoofer produce good sound. The NEC 14X–32X CD-ROM drive boasts one of the fastest spin rates on the budget chart, but our experience suggests that only file transfers and software installations really benefit from higher-speed CD-ROM drives. The XPS D266's familiar home-business software bundle—Microsoft's Office 97 Small Business Edition, with either Bookshelf or Encarta—is helpful.

Clearly marked rear ports and color-coded audio ports with matching speaker plugs ease setup, but the inadequate finger grips along the XPS D266's case edge are annoying: Without somebody else to help you, tugging apart the supposedly easy-open case to access the internal slots and drive bays can be a chore. Inside, no free 16-bit ISA slot is provided. Two DIMM sockets allow upgrades from the standard 32MB of SDRAM. Dell's three-year parts and one-year labor warranty, along with 24-hour toll-free tech support, protects your purchase.

4 QUANTEX QP6/266 WS-3X

PRO: Inexpensive, good support policies

CON: Price doesn't cover ethernet or sound card

The QP6/266 WS-3x falls squarely into Quantex's workstation class of PCs. It starts off with a powerful Pentium II-266 processor and the standard 64MB of RAM and 512KB of secondary cache. The machine romped to an impressive PC WorldBench 98 score of 189, comparable to scores we've seen for some Pentium II-300 machines running Windows NT. The topper: It has an impressively low $1999 price tag.

Quantex QP6/266 WS-3x

But for that price you make sacrifices. The WS-3x lacks an ethernet card, which you'll need if you want to connect to a LAN; if you do, you (or your IS manager) will have to install the card. The WS-3x also has no sound card or speakers, though those aren't necessarily crucial in a work environment. The system does have a Diamond Viper V330 AGP graphics card and a 17-inch MAG InnoVision monitor with the easy-to-use Jag Dial control for on-screen menus. Our configuration came with a K56flex ▶

modem and a fairly big 6.4GB hard drive.

The sturdy tan chassis is easy to open, and the system is neatly designed. But don't plan to rely on the documentation when you want to upgrade: All you'll find are a quick-start guide and some basic support and warranty information. Technical support is available 24 hours a day, seven days a week—but in our anonymous calls we had to wait on hold a while before speaking to anyone.

5 NEC DIRECTION 266L

PRO: Inexpensive, very good performance

CON: Small, dim monitor

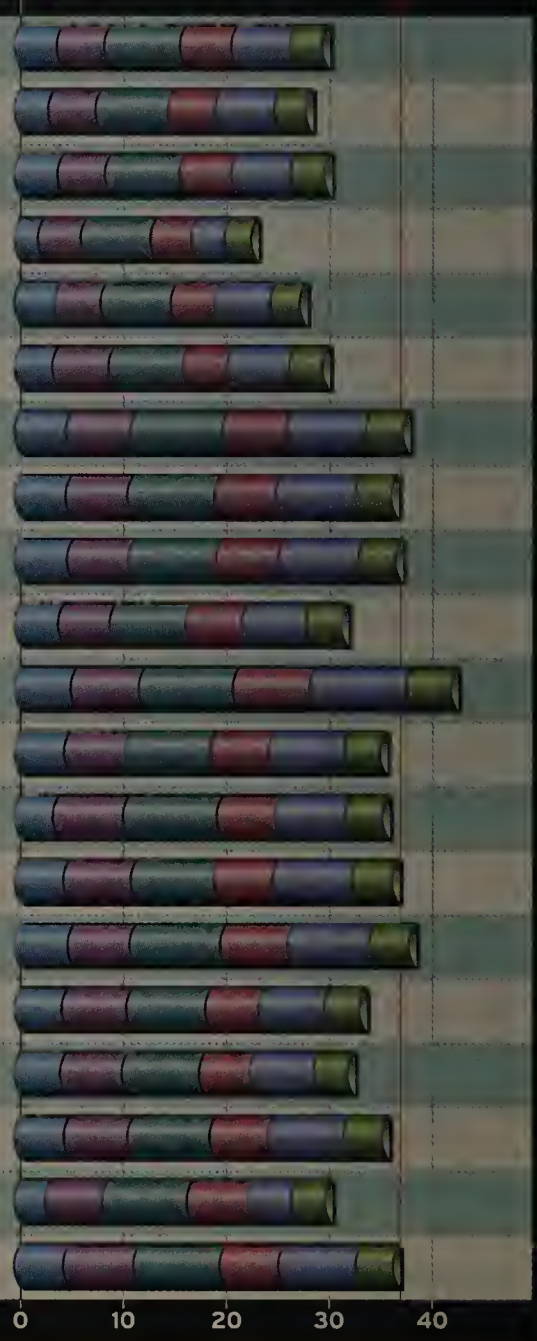
At $1699, NEC's nicely equipped Pentium II-266 midtower should appeal to novice computer users and less-demanding members of the small-office/home-office crowd.

The Direction 266L delivers very robust performance, earning a PC WorldBench 98 score of 156 thanks to its zippy processor, 512KB of secondary cache, and 64MB of RAM. You can do a lot of faxing and phoning quickly and easily with the Direction's internal 3Com 56-kbps x2 fax-voice-modem and desktop microphone. The Direction 266L is no slacker in the multimedia department either, with a 12X–24X CD- ▶

NEC Direction 266L

TOP 20 BUDGET DESKTOPS — TEST REPORT

	SYSTEMS	CPU	Operating system	RAM (MB)	Secondary cache (KB)	PC World-Bench score
1	Gateway G6-266b*	Pentium II-266	Windows 95	32	512	144
2	Gateway E-3110 266*	Pentium II-266	Windows 95	64	512	152
3	Dell Dimension XPS D266*	Pentium II-266	Windows 95	32	512	142
4	Quantex QP6/266 WS-3x*	Pentium II-266	Windows NT 4.0	64	512	189
5	NEC Direction 266L*	Pentium II-266	Windows 95	64	512	156
6	Polywell Poly K6266MX	AMD K6-266	Windows 95	64	512	145
7	Micron Millennia Mme	Pentium MMX-200	Windows 95	32	512	115
8	Everex AGI MMX 233	Pentium MMX-233	Windows 95	32	1024	119
9	Gateway GP5-233	Pentium MMX-233	Windows 95	32	512	118
10	Unicent Avanta L233	Pentium II-233	Windows 95	32	512	135
11	Quantex QP5/200 SM-1	Pentium MMX-200	Windows 95	32	512	96
12	Unicent Avanta T233	Pentium MMX-233	Windows 95	64	512	122
13	Kingdom Pinnacle M200+ V	Cx6x86MX-PR200	Windows 95	32	512	122
14	Xi Computer Xi K200 MTower	AMD K6-200	Windows 95	32	512	117
15	Dell Optiplex Gn+ 233	Pentium MMX-233	Windows 95	32	512	113
16	Micro Express MicroFlex-F225K	AMD K6-233	Windows 95	32	512	128
17	Sys Technology Sys Performance 233K6	AMD K6-233	Windows 95	32	512	133
18	Polywell Poly K6233MX	AMD K6-233	Windows 95	32	512	121
19	Micron ClientPro MRE	Pentium MMX-233	Windows NT 4.0	32	512	143
20	Diamond K6-200	AMD K6-200	Windows 95	32	512	118



*Best Buy

Word 97 · Excel 97 · Picture Publisher 7.0 · Paradox 8.0 · Word Pro 97 · 1-2-3 97

HOW WE TEST All systems are tested with PC World8ench 98, *PC World's* application-based benchmark. A higher PC World8ench score is better. All PCs are tested with either Windows 95 or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC World8ench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Excel 97 (20 percent), Picture Publisher 7.0 (20 percent), Paradox 8.0 (20 percent), Word Pro 97 (10 percent), and 1-2-3 97 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/benchmark).

[1]Under Windows 95.

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puma TECHNOLOGY

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ROM drive and a pair of Altec Lansing ACS-90 speakers.

Another bonus—particularly for first-time PC buyers—is the clear and concise documentation. The manuals contain illustrations of parallel, serial, and Universal Serial Bus ports, and they explain in simple terms what those ports are for. The documentation also covers more-advanced topics—like how to install memory cards and set jumpers—with aplomb.

Polywell Poly K6266MX

But about that monitor: NEC's C550 display has a viewable area of 13.9 inches, which will cramp your viewing style if you regularly scroll through Web pages or edit long documents. What's more, the picture tube on our review unit was slightly dark, even when we turned up the brightness all the way. The four-button control panel forces you to navigate through a complicated on-screen menu to change settings; an array of dedicated buttons would make adjustments easier.

For most small- and home-office users, the Direction's four free add-in slots and four empty drive bays provide more than enough room to grow. You won't need any tools to get inside the system either: We removed the case cover simply by loosening a thumbscrew, pressing on the side panel's tabs, and pulling out the panel. Getting to the one free memory socket is a bit tricky, however, due to the bulky tangle of interior cables. The biggest concern for SOHO users, though, is the below-average reliability rating our readers have hung around NEC's neck.

New This Month

The following PCs made our budget desktops chart for the first time this month. For original reviews of previously tested PCs on the chart, visit our Web page (www.pcworld.com/t20pcs).

6 POLYWELL POLY K6266MX

PRO: Good speed, memory is easy to add

CON: Not cutting edge, poor support quality

The Polywell Poly K6266MX is a machine designed for tinkerers: Besides holding 64MB of SDRAM, it provides four empty sockets for EDO DRAM, so you can add RAM from an older system if you're upgrading to the Poly. It's also large enough to make future expandability a snap. The K6266MX has three open drive bays and four available slots, so you can juice it up with a lot of extras.

It's certainly one of the sturdiest machines on the budget chart—a very wide midtower with a heavy-duty case. And its $1950 price tag ensures that you'll have some spare change left over to throw at goodies like speakers and a better sound card.

The Poly's PC WorldBench 98 score of 145 is within 10 percent of the budget Best Buy systems' average, but how does its score stack up against those of other systems in its processor class? Since the Poly K6266MX is the only AMD K6-266–based system we've tested thus far with our new PC WorldBench 98 test suite, we had to compare how its performance measured up to that of Pentium II-266 machines: In these matchups, the Poly's score is only a little below average.

The Poly has some high-end goodies—a K56flex modem and a roomy 7GB hard drive, for example—but it's by no means cutting edge. It isn't equipped with an Accelerated Graphics Port slot for the newest video cards, and the graphics board it does come with—a Diamond Stealth 3D 2000 Pro—isn't very good at handling 3D.

Though the Poly K6266MX's steel case can withstand most of the thumps that PCs commonly receive at their owners' hands, Polywell offers a longer-than-average warranty on the system: three years for parts, five years for labor. Technical support people answer the phone for only 10 hours on weekdays and 4 hours on Saturday—which might suffice if you keep normal working hours but isn't nearly enough, in our opinion. Our experience with Polywell's technical support was pretty dismal: It took us five days of leaving voice-mail messages to get a single response to a support call.

8 EVEREX AGI MMX 233

PRO: Impressive performance for the price

CON: Poor-quality components, short warranty

For such an inexpensive system—the cheapest on the charts—the $1180 Everex AGI MMX 233 performed impressively. The AGI's PC WorldBench 98 score of 119 is only slightly below average for its Pentium MMX-233 processor class. Considering this machine's rock-bottom price, we weren't surprised that it used older technology and offered only thin upgrade options.

The Everex AGI does include a K56flex modem and a relatively speedy 12X–24X CD-ROM drive, but you shouldn't expect whiz-bang hardware at this price. You'd get better sound from an AM clock radio than from the AGI's dinky Benwin speakers. Two words, Everex: Why bother? And the 15-inch Everex 15A monitor's primitive controls don't allow much adjustment of the tiny, fuzzy images that are compressed into the sub-14-inch viewing area.

Getting inside the gray midtower case of the computer is easy, but it's a mess in there. If you manage to wind through the sloppily crisscrossing drive cables, you will find an unimpressive 32MB of RAM occupying half your SIMM real estate. In addition to the SIMM sockets, the AGI has two DIMM sockets, both of which are open. You'll also be faced with cramped drive quarters if you plan to upgrade the 3.2GB hard disk.

Everex AGI MMX 233

Everex has one of the shortest warranty periods around—one year for parts and labor—but the company's 24-hour phone support is toll-free. When we called for help, we found the technicians helpful and very friendly. ▶

Beyond the Top 20: Online

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 20 Budget Desktops chart. For write-ups, see PC World Online (www.pcworld.com/t20pcs).

- **NEC Direction 233L**
- **NexTrend P/200 MMX**
- **NMC Pentium II-233**
- **Nova P200TX**
- **Quantex QP6/233 SB-3x**

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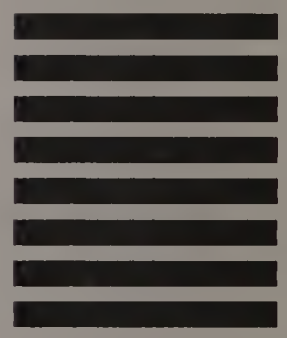

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PC WORLD

TOP 10 NOTEBOOK PCs

	POWER NOTEBOOKS	Last month	Month tested	Street price (2/11/98)	CPU	Comments
1	Micron Transport XKE 266 800/393-8935 www.micronpc.com	n/a	NEW	$3986	Pentium MMX-266	$462 price cut, fastest notebook we've tested, multimedia extras; heavy.
2	Quantex H 1330 800/896-4898 www.quantex.com	4	retested [4]	$2999	Pentium MMX-233	$150 price drop, upgraded RAM and modem; so-so traveling weight.
3	Compaq Armada 4220T 800/345-1518 www.compaq.com	n/a	NEW	$3999	Pentium MMX-266	Thin design, hot performance; no modem or CD-ROM drive.
4	Sony VAIO PCG-719C 800/476-6972 www.sony.com/pc	n/a	NEW	$2999	Pentium MMX-233	Light, inexpensive; slow CD-ROM drive.
5	Dell Inspiron 3000 M266XT 800/388-8542 www.dell.com	3	retested [4]	$2899	Pentium MMX-266	$400 price cut on notebook with large screen; no modem.
	BUDGET NOTEBOOKS					
1	Micron Meridian 800/393-8935 www.micronpc.com	1	retested [4]	$2299	Pentium MMX-166	$100 cut in cost, notable for reliability; no bay for second battery.
2	CTX EzBook 774 MT-MK 800/888-9052 www.ctxintl.com	n/a	NEW	$2049	Pentium MMX-200	Great price, respectable battery; subpar support policies.
3	Acer Extensa 394T 800/733-2237 www.acer.com/aac	n/a	NEW	$2499	Pentium MMX-200	Killer battery, internal CD-ROM drive; pricey, no docking station option.
4	WinBook XL K6 233 800/965-9349 www.winbook.com	n/a	NEW	$2558	AMD K6-233	Fast budget notebook, speedy modem; poor support policies.
5	AMS Tech Travel Pro 106CS 800/886-2671 www.amstech.com	3	retested [4]	$1395	Pentium MMX-166	$440 price cut on low-priced notebook; very weak battery.

Best Buy See features chart, page 250.

n/a = not applicable [1] Includes computer, adapter, power cord, and floppy drive or CD-ROM drive. [2] For more information about all products in this table, circle reader service no. 906.

THIN IS IN! It's the latest trend in a splintering market that has recently produced beefy notebooks for your desktop and miniaturized subnotes for your palmtop. Now comes the so-called *thin and light* variety aimed at yet another specific group of consumers—travelers who want the computing power and features of a standard notebook but don't want the bulk and weight of a full-size model.

That's a lot of travelers. Notebook makers have long struggled to produce slimmer floppy, CD-ROM, and hard drives, and thinner screens. The result, at first glance, is impressive. Each of the three thin and light systems we tested, including the Sony VAIO PCG-719C, is about 1.5 inches thick and weighs approximately 6.5 pounds–half an inch slimmer and at least a pound lighter than standard notebooks.

But beware—the relative frailty of thin and light notebooks may be a problem. Some vendors are using thinner plastic cases. Others are placing hard drives up against the case rather than leaving a space cushion for protection.

In all, we tested 14 new notebooks and reexamined 12 others. Notebooks from Gateway, Dell, Acer, Quantex, and Toshiba were pushed off the charts by newcomers. On the power side, the Micron Transport XKE 233, a second-place finisher in April, now has an upgraded PMMX-266 CPU and grabs first place. Micron also takes top honors in the budget chart with its versatile Meridian. The AMD-based WinBook XL K6 233, which finishes fourth, deserves a special nod from consumers for giving Intel new competition in the notebook market.

Transport XKE 266

This Month's Best Buys

POWER NOTEBOOKS

1 MICRON TRANSPORT XKE 266

PRO: Superb multimedia features, fastest tested

CON: Costly, heavy

If you're looking for a fine, ultrafast multimedia notebook, try the $3986 Micron Transport XKE 266.

Micron upgraded its XKE with the latest PMMX-266 processor and an enormous 8.2GB hard drive, creating the fastest notebook we've ever tested. The portable also boasts three audio and video output ports: the standard CRT port for connecting to a monitor; an RCA composite port that allows hookup to a big-screen overhead display or TV; and a port for S-Video, which delivers even greater resolution than RCA on an external screen that supports the technology.

Like a few other high-end portables we've seen, this one comes with autoplay, which

SCORECARD

★ Overall rating	PC WorldBench score/ performance	Price	Vendor's system reliability	Features and design	Vendor's support quality/policies	Battery life (hours:min)/ rating	Traveling weight [1]	Reader service number [2]
89	126/outstanding	average	above average	outstanding	[3]/fair	8:34/outstanding	heavy	654
85	113/good	inexpensive	[3]	outstanding	[3]/good	5:46/good	average	655
84	120/very good	average	average	good	above average/fair	7:27/outstanding	light	656
83	109/good	inexpensive	[3]	outstanding	[3]/poor	5:31/good	light	657
83	113/good	very inexpensive	average	good	average/fair	5:03/good	average	658
Power scorecard weightings ▶	Performance 22 percent	Price 14 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	
84	91/good	average	above average	very good	[3]/fair	5:17/good	light	659
84	100/very good	inexpensive	[3]	very good	[3]/poor	5:38/good	average	660
81	101/very good	expensive	[3]	good	[3]/fair	8:20/outstanding	light	661
81	114/outstanding	expensive	average	good	average/poor	6:22/very good	average	662
80	71/satisfactory	very inexpensive	[3]	satisfactory	[3]/fair	2:02/unacceptable	average	663
Budget scorecard weightings ▶	Performance 14 percent	Price 22 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	

[3] Insufficient data to give a rating.

[4] Retested this month using new PC WorldBench 98 test suite.

means you don't have to turn the notebook on to play audio CDs. Plug in the headphones that come with the notebook, and the 12X–24X CD-ROM drive turns on automatically; a full set of audio controls located on the face of the drive makes fine-tuning the sound a snap.

In keeping with the spirit of loading this notebook with everything but bucket seats, Micron has included two pointing devices—a touchpad and an eraserhead—in the standard package. Gamers will appreciate the MIDI/game port.

You won't want to carry the 9.4-pound XKE 266 a long distance. But it has an outstanding battery life of 8.5 hours, plus two modem ports—one for a phone cord, the other for a cell phone.

Our readers rate Micron notebooks as above average in reliability. However, the company's service policies—a one-year parts and labor warranty backed with unlimited toll-free, round-the-clock technical support—are merely fair.

BUDGET NOTEBOOKS

1 MICRON MERIDIAN

PRO: Multipurpose, good battery

CON: Low sound volume, poor design

The $2299 Micron Meridian is a classic utility player—able to do a solid job in all areas of notebook computing without a lot of flash.

At the office, its Pentium MMX-166 processor works well with big applications. And on the road, the Meridian again wins high marks. It tips the scales at a fairly light 7.2 pounds, and its battery lasted a respectable 5.3 hours in our test.

Micron Meridian

We have a few design concerns, though. A single latch holds the battery in place beneath the notebook; the standard bay design is easier to use. Placement of the heat-releasing vents is also unusual. These holes run vertically along each side of the keyboard and are just the right size to trap crumbs from your lunch.

Our readers applaud the reliability of Micron notebooks. But when we dialed the company's around-the-clock technical support line, the hold time for our calls was 13 minutes each—not exactly quick.

New This Month

The following PCs made our power and budget notebooks charts for the first time this month. To find original reviews of previously tested notebooks ranked on this month's charts, visit our Web page (www.pcworld.com/t20pcs).

POWER NOTEBOOKS

3 COMPAQ ARMADA 4220T

PRO: Multiuse battery pack, three-year warranty

CON: No CD-ROM drive or modem

The long tube bracketed to the back of the Compaq Armada 4220T looks like a warp-drive engine from the Starship Enterprise. Though its functions are ▶

Compaq Armada 4220T

PHOTOGRAPHS: KEN SMITH

TOP 10 NOTEBOOK PCs — STANDARD FEATURES

	POWER NOTEBOOKS	CPU	Traveling weight (pounds)[1]	RAM (MB)	Hard drive (GB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Micron Transport XKE 266*	Pentium MMX-266	9.4	64	8.2	active	13.3	1024 x 768	65,536	lithium ion	eraserhead, touchpad
2	Quantex H 1330	Pentium MMX-233	7.6	64	3.2	active	13.3	1024 x 768	65,536	lithium ion	touchpad
3	Compaq Armada 4220T	Pentium MMX-266	7.2	32	4	active	12.1	800 x 600	16.8 million	lithium ion	touchpad
4	Sony VAIO PCG-719C	Pentium MMX-233	6.4	32	2	active	12.1	1024 x 768	16.8 million	lithium ion	touchpad
5	Dell Inspiron 3000 M266XT	Pentium MMX-266	7.4	32	3.2	active	13.3	1024 x 768	16.8 million	lithium ion	touchpad
	BUDGET NOTEBOOKS										
1	Micron Meridian*	Pentium MMX-166	7.2	32	2.1	active	12.1	800 x 600	65,536	NiMH	touchpad
2	CTX EzBook 774 MT-MK	Pentium MMX-200	8.2	40	2	active	12.1	800 x 600	65,536	NiMH	touchpad
3	Acer Extensa 394T	Pentium MMX-200	7.2	32	3.2	active	12.1	800 x 600	65,536	lithium ion	touchpad
4	WinBook XL K6 233	AMD K6-233	8.4	32	2	active	12.1	800 x 600	65,536	lithium ion	eraserhead, touchpad
5	AMS Tech Travel Pro 106CS	Pentium MMX-166	8.4	16	1.4	dual-scan	12.1	800 x 600	65,536	NiMH	touchpad

*Best Buy ● Yes ○ No [1] Includes computer, adapter, power cord, and floppy drive or CD-ROM drive. [2] Downloads only, uploads at 33.6 kbps; uses 3Com/U.S. Robotics' x2 technology.

considerably more earthbound, this multitalented tube turns the Armada into an unusual travel companion.

The tube houses a battery that lasted an outstanding 7.5 hours in our test. It also functions as a carrying handle for the notebook. And if you tilt the hinged tube downward, it becomes a stand that raises the back of the notebook for easier typing.

The exterior placement of the battery helped thin the notebook to 1.5 inches. But at 7.2 pounds, it outweighs other vendors' new thin and light models.

Regrettably, the $3999 Compaq doesn't have a modem or a CD-ROM drive—necessities for mobile computing. To get a CD-ROM drive, you must buy a separate media plate that snaps onto the bottom of the notebook.

To its credit, Compaq is the only vendor on this month's power chart to offer a three-year parts and labor warranty.

4 SONY VAIO PCG-719C

PRO: Long battery life, good price

CON: Fragile case

As the first thin and light notebook to reach our power chart, the Sony VAIO PCG-719C embodies both the best and the worst of this new trend in travel PCs.

At 1.5 inches thick and 6.4 pounds, this slender portable will hit the spot with travelers. Its lavender case looks like an overstuffed manila folder and fits conveniently into a briefcase. The 5.5-hour battery life is nothing to scoff at, and if you need more juice on your travels, you can install a second power pack.

Unfortunately, however, thin and light can also mean fragile. To reduce weight, Sony used an especially thin plastic that we found to be unduly brittle. Two port covers snapped off during our brief examination, and the hard drive's hinged cover broke when we latched it.

Sony VAIO PCG-719C

At $2999, the Sony is inexpensive for a notebook. But you may be paying a premium for thin and light technology. For example, the Quantex H 1330, a standard-size notebook on this month's chart, has a larger screen, a bigger hard drive, and a faster modem than the Sony for the same price.

Sony offers a standard one-year warranty. Less typical is the company's stingy tech support. Rather than offering unlimited toll-free service, Sony makes you pay the toll on calls after the first year.

BUDGET NOTEBOOKS

2 CTX EZBOOK 774 MT-MK

PRO: Bargain price, bright screen

CON: Weak support policies

Students searching for a good all-around notebook to write those interminable research papers should investigate the affordable CTX EzBook 774 MT-MK.

Its PC WorldBench 98 score of 100 matches other PMMX-200 notebooks', and the CTX costs $450 less than the similar Acer Extensa 394T, also a chart maker.

No one will mistake the 8.2-pound unit for a feather, but the weight won't seem so bad to students accustomed to schlepping around an overloaded backpack. And with 5.6 hours of battery life available, you can get a lot of work done at the library—or under a tree. When cranking out papers late at night, you'll appreciate the system's bright active-matrix screen and crisp text.

The black notebook's two modular bays give you flexibility. You can use the floppy and CD-ROM drives at the same time or install two batteries at once when you have to pull an all-nighter.

CTX EzBook 774 MT-MK

Enjoy extracurricular activities? The MIDI/game port just might delay your arrival at the lecture hall, and the 33.6-kbps

		EXPANDABILITY					CUSTOMER SUPPORT			
CD-ROM drive speed	Modem speed (kbps)	Maximum RAM (MB)	Modular expansion bays	Bay for second battery	Optional docking station	Infrared port	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
12X-24X	56 [2]	192	2	○	●	●	1/1	24	Sat., Sun.	BBS, CIS, WWW
8X-20X	56 [2]	144	2	●	●	●	varies[3]/1	24	Sat., Sun.	BBS, WWW
not included	not included	96	1	●	●	●	3/3	24	Sat., Sun.	AOL, BBS, CIS, WWW
14X	33.6	128	1	●	●	●	1/1	24	Sat., Sun.	WWW
12X-20X	not included	144	1	●	○	●	1/1	24	Sat., Sun.	BBS, WWW
12X-20X	33.6	40	1	○	○	●	1/1	24	Sat., Sun.	BBS, CIS, WWW
12X-16X	33.6	40	2	●	○	●	1/1	12	none	WWW
8X-20X	33.6	128	0	○	○	●	1/1	24	Sat., Sun.	BBS, CIS, WWW
12X-20X	56 [4]	128	0	○	○	●	1/1	13	Sat.	BBS, WWW
14X-20X	not included	80	1	●	●	●	3/3	11	none	BBS, CIS, WWW

[3] Three years on CPU and main RAM; one year on other parts. [4] Downloads only, uploads at 33.6 kbps; uses Rockwell-Lucent's K56flex technology.

modem, paired with Internet Explorer 4.0, will let you hop onto the Web for a round of You Don't Know Jack on the eve of final exams.

But before you spend next year's tuition on the EzBook, consider that we don't have enough survey data to rate the reliability of CTX's notebooks. And the company's support policies—12 hours of technical support on weekdays and none on the weekend—are poor. We had to wait up to 45 minutes when we called for help, and we found the advice adequate.

Acer Extensa 394T

3 ACER EXTENSA 394T

PRO: Long-lasting battery, sharp display

CON: External floppy drive

Do you hate to be interrupted at work? The Acer Extensa 394T lets you board a plane in Dallas, fire up the Acer, and not switch batteries till you land in London 8 hours later. Acer credits this great battery life to a proprietary power-saving scheme. The system's 7.2-pound heft and internal 33.6-kbps modem also make it appealing.

The Extensa 394T turned in a sharp PC WorldBench 98 score of 101—only one point shy of the record for its PMMX-200 class. The CTX EzBook 774, second on this month's budget chart, offers similar performance for a better price, but it doesn't travel as well.

The charcoal-gray Acer's keyboard has keen response. We also liked the snap-out hard drive, which keeps data secure. Our main complaint: The floppy drive is external.

Though a third of the vendors in the industry offer a three-year parts and labor warranty, Acer provides a one-year deal.

4 WINBOOK XL K6 233

PRO: Fine performance, touchpad and eraserhead

CON: Comparatively heavy, poor support

WinBook's XL K6 233 proves that Intel processors now face serious competition in the notebook arena. Powered by the new mobile version of AMD's K6 233, the XL will appeal to buyers looking for hot performance at a budget price.

AMD's challenge has been to produce CPUs that outperform Intel's or cost less. This WinBook suggests that AMD has done both. At $2558, the notebook is cheaper than any of the PMMX-233 portables we've seen recently, and it outperforms most of them. The similarly configured Micro Express NP6450, among this month's also-rans, sells for $140 more and is slower than the WinBook.

Beyond charcoal-gray good looks, the K6 233 has a peppy keyboard and both a touchpad and an eraserhead. You won't have to swap components either, because the 12X–20X CD-ROM drive, floppy drive, and K56flex modem are all internal.

At 8.4 pounds, the WinBook isn't svelte. But you'll like its 6.3 hours of battery life, and the notebook's sturdy design will help it withstand the rigors of the road. If you make presentations outside the office, you'll appreciate the video-out port.

WinBook XL K6 233

The WinBook's documentation is first-class, though support policies are thin. In our calls, we got good technical advice. ■

Beyond the Top 10: Online

We evaluated these systems along with the others, but they didn't score high enough to reach the Top 10 Notebook PCs chart. For write-ups, see PC World Online (www.pcworld.com/t20pcs).

- **AMS Tech Rodeo 3030ECX**
- **Digital HiNote VP 745**
- **Micro Express NP6450**
- **Panasonic CF-35**
- **Panasonic CF-63**
- **Quantex H 1331**
- **Sony VAIO PCG-717C**
- **Transmonde Vivante SE**

PC WORLD

TOP 10 HOME PCs

	POWER SYSTEMS	Last month	Month tested	Street price (2/11/98)	Comments
1	Micron Millennia XKU 266 888/634-8799 www.micronpc.com	n/a	NEW	$2249	PRO: Peppy midrange Pentium II, first-rate reliability and service ratings. CON: Setup instructions didn't explain how to connect subwoofer to PC.
2	Micron Millennia XKU 300 888/634-8799 www.micronpc.com	3	retested [1]	$2723	PRO: Very fast, plenty of RAM, good sound system, super price for its feature set, great reliability and service ratings. CON: Limited software, some flex in case.
3	Dell Dimension XPS D300 800/388-8542 www.dell.com	1	retested [1]	$2599	PRO: Loaded home-entertainment power machine, first-class reliability and service rating. CON: Not cheap, limited software package, weak setup instructions.
4	Gateway G6-266 Perfect Scholar PC 800/846-2000 www.gateway.com	n/a	NEW	$2129	PRO: Excellent variety of software bundles, good price for a lot of power. CON: Software documentation not very extensive.
5	Gateway G6-300h 800/846-2000 www.gateway.com	n/a	NEW	$2963	PRO: Comes with DVD-ROM drive, big monitor, and TV tuner card; great software bundle. CON: Most expensive machine on chart.
	BUDGET SYSTEMS				
1	Dell Dimension XPS D233c 800/388-8542 www.dell.com	1	retested [1]	$1829	PRO: Fastest PC on budget chart; above-average reliability and service ratings. CON: Expensive for budget system, skimpy software bundle, setup instructions need improvement.
2	Gateway G5-233 800/846-2000 www.gateway.com	n/a	NEW	$1499	PRO: Nice price for starter PC with color printer, decent mix of software titles. CON: Small hard disk, minimal RAM.
3	Gateway G6-233 H. E. 800/846-2000 www.gateway.com	n/a	NEW	$1769	PRO: Cheapest PII on the budget chart, large monitor, very good setup instructions. CON: Small hard disk.
4	HP Pavilion 3260 800/426-7235 www.hp.com	n/a	NEW	$1198	PRO: Lowest price on the chart, terrific PC for first-time buyers. CON: No secondary cache and minimal video RAM make for very slow performance.
5	IBM Aptiva E26 800/426-7235 www.ibm.com/pc/us/ibmhome	n/a	NEW	$1348	PRO: Good tutorial for beginners, setup is a snap. CON: Performance is on the slow side, skimpy video RAM.

Best Buy

n/a = not applicable [1] System retested using new PC WorldBench 98 test suite.

IT'S THAT TIME OF YEAR—time to face the ugly mess in your office, clean it up, and put it back together again. So with this month's *Top 10 Home PCs,* we did a little spring cleaning. We took 25 home systems—both new machines and past chartmakers—and ran them through PC WorldBench 98, an updated version of our test suite that gauges how well PCs run the latest 32-bit apps.

Several PC vendors have also refreshed their product lines with more memory, faster processors, and lower prices. The result: Seven new PCs land on this month's chart, four of them Pentium IIs. Not only do the PIIs completely rule the power category, they're also steadily expanding their presence on the budget list as well.

Our standards for defining the best in power and budget machines haven't changed, though. To rank high, a system has to hit the sweet spots in price, performance, and reliability. And, as a result of Micron's enormous price drops, the Millennia XKU 266 and XKU 300 steal the top two notches in our Power list.

POWER SYSTEMS

PENTIUM II SYSTEMS monopolize the power chart this month, and Micron's Millennia XKU 266 is at the top of the pack. This sturdy $2249 minitower is great for handling huge databases or for playing action-packed games. The setup instructions are so complete that we were up and running (and online) in 30 minutes, though the documentation fails to mention how to connect the speakers' subwoofers to the machine.

Micron's Millennia XKU 300 is number two. Besides the requisite Pentium II-300 CPU, 64MB of RAM, and a 6.4GB hard disk, the $2723 XKU comes with a killer set of Cambridge Soundworks MicroWorks speakers and a bevy of game titles. The XKU 300 is an ideal choice as your home-office workhorse and entertainment hub.

In third place is Dell's Dimension XPS D300. The $2599 Pentium II-300 comes with a DVD drive, a 17-inch monitor, and Microsoft Office Small Business Edition, but not a whole lot else. Still, it's a good choice as a powerful home-office system.

Gateway's G6-266 Perfect Scholar PC, at number four, lands on the chart for the first time; at $2129 it's the most economical power machine this month. Combining a Pentium II-266 processor with 32MB of RAM, the G6-266 can handle any business application you throw at it.

Micron Millennia XKU 266

Gateway stars again in the fifth spot with the G6-300h—and it's pricey at $2963. With 64MB of RAM and a whopping 8GB hard disk, the PII-300 G6-300h is powerful enough to

PHOTOGRAPHS: KEN SMITH

SCORECARD

★ Overall rating	PC WorldBench 98 score/rating	Price	Reliability/ support	Setup	Features	Reader service number
80	151/outstanding	expensive	above average/ above average	good	Pentium II-266, 32MB of RAM, 6.4GB hard disk, 13X-32X CD-ROM drive, 56-kbps fax-modem, Iomega Zip drive, 17-inch monitor, AGP graphics card.	618
79	165/outstanding	expensive	above average/ above average	good	Pentium II-300, 64MB of RAM, 6.4GB hard disk, 13X-32X CD-ROM drive, 56-kbps fax-modem, Iomega Zip drive, 17-inch monitor, AGP graphics card.	619
79	150/outstanding	expensive	above average/ above average	fair	Pentium II-300, 32MB of SDRAM, 6.4GB hard disk, 2X DVD-ROM drive, Cinemaster II MPEG decoder card, 56-kbps fax-modem, 17-inch monitor, AGP graphics card.	620
78	153/outstanding	average	average/ above average	good	Pentium II-266, 32MB of SDRAM, 4.3GB hard disk, 13X-32X CD-ROM drive, 56-kbps fax-modem, 17-inch monitor, AGP graphics card.	621
76	172 [2]/outstanding	very expensive	average/ above average	good	Pentium II-300, 64MB of RAM, 8GB hard disk, 2X DVD-ROM drive, 56-kbps fax-modem, 19-inch monitor, AGP graphics card, TV tuner.	622
Power scorecard weightings ▶	Performance 30 percent	Price 15 percent	R/S 40 percent	Setup 5 percent	Features 10 percent	
84	136/outstanding	expensive	above average/ above average	fair	Pentium II-233, 32MB of RAM, 4.3GB hard disk, 14X-32X CD-ROM drive, 56-kbps fax-modem, 15-inch monitor, AGP graphics card.	623
83	81/fair	inexpensive	average/ above average	outstanding	Pentium MMX-233, 16MB of SDRAM, 2GB hard disk, 13X-32X CD-ROM drive, 56-kbps fax-modem, 15-inch monitor, Canon BJC-4300 color bubble jet printer.	624
82	132/outstanding	expensive	average/ above average	outstanding	Pentium II-233, 32MB of SDRAM, 2GB hard disk, 13X-32X CD-ROM drive, 56-kbps fax-modem, 17-inch monitor, AGP graphics card.	625
81	77/fair	very inexpensive	average/ average	outstanding	Pentium MMX-200, 32MB of SDRAM, 2GB hard disk, 16X CD-ROM drive, 56-kbps fax-modem, 15-inch monitor.	626
81	97/fair	inexpensive	average/ average	outstanding	AMD K6-233 with MMX, 32MB of SDRAM, 3GB hard disk, 12X-24X CD-ROM drive, 56-kbps fax-modem, 15-inch monitor.	–
Budget scorecard weightings ▶	Performance 15 percent	Price 30 percent	R/S 40 percent	Setup 5 percent	Features 10 percent	All products: 903

[2] The Gateway G6-300h's score is extraordinarily high for its processor class. It may drop to a lower score pending further investigation.

handle heavy-duty video and imaging apps, demanding games, and just about anything else. Its 2X DVD drive, TV tuner, and large 19-inch monitor make the G6-300h a home entertainment dream PC. But take note: We initially encountered some problems with the Gateway systems' keyboard drivers, which affected performance. See this month's Top 100 introduction for details.

HP Pavilion 3260

BUDGET SYSTEMS

DELL'S DIMENSION XPS D233c narrowly retains the top spot for the third month in a row. Coupling raw Pentium II horsepower with AGP graphics and Dell's first-class reliability and service ratings, the $1829 D233c is a good choice if you're looking for speed at a reasonable price.

New at number two is Gateway's G5-233, bundling a bevy of home productivity titles and a color bubble jet printer in one tidy package, all for a modest $1499. Though not geared for hard-core computing, the G5-233 is fine for a small or start-up home business.

Gateway also grabs the third spot with its $1769 G6-233 H.E. The Pentium II speed and AGP graphics are offset by a smallish 2GB hard disk and the company's so-so reliability rating. But the great setup instructions and 17-inch monitor make it a welcome tool for your home-office.

The HP Pavilion 3260 pops up at number four. Priced at $799 ($1198 with monitor), it's the least-expensive system ever on the budget chart. It's also by far the chart's slowest. Still, the price is astonishingly good for a Pentium-level computer, and the Pavilion's customized online support and system wizard make it easy to use.

Finally, the $999 IBM Aptiva E26 ($1348 with monitor) steals the last spot on the chart from its lower-end cousin, the Aptiva E16 (number four last month). An average performer for a budget computer, the E26 comes bundled with Lotus SmartSuite 97. Based on Advanced Micro Devices' K6-233 processor, this system is underpowered for video- or CPU-intensive applications like 3D games, but it's a great choice for managing your household finances or helping your kids write letters and do homework.

—*Susan Silvius*

Susan Silvius is an occasional contributor to PC World. *Testing performed by Ulrike Diehlmann of the PC World Test Center.* ■

Beyond the Top 10: Online

We evaluated the following systems this month also, but they didn't score high enough to make the Top 10 Home PCs list. For write-ups, see PC World Online (www.pcworld.com/t10homepcs).

- **Acer Aspire 1830**
- **Compaq Presario 4540**
- **Compaq Presario 4550**
- **Compaq Presario 4640**
- **Compaq Presario 4860**
- **CyberMax Max Media**
- **NEC Ready 9870**
- **Seanix Baby Grand CS**
- **Sony PCV-230**

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PC WORLD

TOP 10 PRINTERS

	MONOCHROME WORKGROUP PRINTERS	Month tested	Street price (2/3/98)	Overall rating	Speed for plain text (ppm)	Speed for full-page graphics (ppm)	Comments	Reader service number
1	HP LaserJet 4000 TN 800/752-0900 www.hp.com	Jan 98	$1599	95	12.8	3	**FEATURES:** 17-ppm laser. Standard 8MB of RAM, 1200-by-600-dpi resolution, 600 sheets input, 300 output. **PRO:** Fastest, great text quality, large paper capacity. **CON:** Clearing paper jams could be easier, mediocre graphics at default settings, most expensive on monochrome chart.	675
2	Lexmark Optra S 1620 800/539-6275 www.lexmark.com	Mar 98	$999	93	11.5	2.2	**FEATURES:** 16-ppm laser. Standard 4MB of RAM, 1200-by-1200-dpi resolution, 350 sheets input, 250 output. **PRO:** Inexpensive, good print quality (especially with gray-scale), simple control-panel menu, sturdy design. **CON:** Text can print too dark, fewer paper-handling options than on 1650 model.	676
3	Lexmark Optra S 1650 800/539-6275 www.lexmark.com	July 97	$1129	92	11.6	2.4	**FEATURES:** 16-ppm laser. Standard 4MB of RAM, 600-by-600-dpi resolution (and true 1200 by 1200), 250 sheets input and output. **PRO:** Extremely fast, easy to use, sharp print quality, includes serial port. **CON:** Gray-scales are subtle but a little coarse, documentation can be confusing.	677
4	Brother HL-1660 908/704-1700 www.brother.com	Mar 98	$1299	84	11.4	2.4	**FEATURES:** 17-ppm laser. Standard 4MB of RAM, 600-by-600-dpi resolution, 650 sheets input, 250 output. **PRO:** Fast, good text quality and paper-handling options, fewer jams with heavy paper stock than most printers. **CON:** Graphics lose detail, most of manual comes only on CD-ROM, control panel can be confusing.	678
5	NEC SuperScript 1260 800/632-4636 www.nec.com	Sept 97	$699	81	8.8	2	**FEATURES:** 12-ppm laser. Standard 2MB of RAM, 600-by-600-dpi resolution, 330 sheets input, 250 output. **PRO:** Least expensive on chart, good graphics printing, 1260N model includes ethernet for $979. **CON:** Text looks somewhat jagged, slowest printer on monochrome chart.	679
	COLOR WORKGROUP PRINTERS							
1	Epson Stylus Color 1520 800/463-7766 www.epson.com	Sept 97	$799	88	3.2	0.9	**FEATURES:** 6-ppm monochrome/5-ppm color ink jet. Standard 64KB of RAM, 1440-by-720-dpi monochrome/color resolutions, 100 sheets input, 35 output. **PRO:** Extremely inexpensive, gorgeous color quality. **CON:** Very slow text speed, meager paper capacity, needs special stock for best print quality.	–
2	Xerox DocuPrint C55mp Color Laser Printer 800/349-3769 www.xerox.com	Sept 97	$4000	85	8.1	0.5	**FEATURES:** 12-ppm monochrome/3-ppm color laser. Standard 30MB of RAM, 600-by-600-dpi monochrome/color resolutions, 250 sheets input, 150 output. **PRO:** $500 price drop, great output, fast color text speed, has $500 ethernet card and PostScript. **CON:** Power switch is inconveniently located.	680
3	Minolta Color PageWorks PS 888/264-6658 www.minoltaprinters.com	NEW	$3299	85	8.4	0.5	**FEATURES:** 12-ppm monochrome/3-ppm color laser. Standard 20MB of RAM, 600-by-600-dpi monochrome/color resolutions; 400 sheets input, 250 output. **PRO:** Now includes PostScript, 20 percent faster than non-PS version, good paper-handling features. **CON:** Gray-scale images are a little coarse.	681
4	Lexmark Optra SC 1275 800/539-6275 www.lexmark.com	Jan 98	$3999	82	7.4	1	**FEATURES:** 12-ppm monochrome/3-ppm color laser. Standard 16MB of RAM, 600-by-600-dpi monochrome/color resolutions, 400 sheets input, 250 output. **PRO:** Fastest graphics, good text quality, many expansion options. **CON:** Blocky graphics and garish colors, complicated drivers.	682
5	Tektronix Phaser 560 800/835-6100 www.tek.com/color_printers	Jan 98	$3995	82	6.5	0.5	**FEATURES:** 14-ppm monochrome/4-ppm color laser. Standard 8MB of RAM, 600-by-600-dpi monochrome/color resolutions, 250 sheets input, 500 output. **PRO:** Great print quality, can print labels and envelopes in color. **CON:** Replacing fuser and drum is awkward.	683

Best Buy Windows 95-certified Plug and Play All products: 908

HOW WE TEST The overall rating for both monochrome and color workgroup printers is based on print quality (27 percent), price (20 percent), features and ease of use (20 percent), speed (15 percent), service and support (13 percent), and consumables (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

IF "COLOR IN THE WORKPLACE" is the latest catchphrase, some printer companies aren't listening. The new color workgroup printers we've seen don't live up to the high expectations induced by all the hype. We tested two new color models this month, but neither makes our chart. The $3200 QMS Magicolor 2 CX produces high-quality prints for a good price, but it runs slow and could be easier to use. The $3695 Tektronix ▶

Phaser 360, a solid-wax printer, is speedier than the QMS, but its print quality should be better in view of its higher price. We still recommend the $799 Epson Stylus Color 1520 ink jet for good print quality at a great price.

QUALITY COLOR FROM MINOLTA

THE ONLY PRINTER to land anew on our color chart this month is the Minolta Color PageWorks PS, which replaces its non-PS sibling at number three. (PS stands for PostScript, a page description language created by Adobe Systems.) Minolta still sells both models, but the $3299 PS version is much faster and costs only 10 percent more.

With PostScript, the Minolta's text-printing speed climbs almost 20 percent, from around 7 pages per minute to 8.4 ppm—the fastest on our color chart. The gray-scale graphics speed jumps nearly 50 percent, from a paltry 0.3 ppm to a respectable 0.5 ppm. Print quality remains good all around. But the Minolta can't unseat the number two Xerox DocuPrint C55mp, especially now that the Xerox—with ethernet, PostScript, and lots of memory—sells for $4000, down from $4500, according to a recent price survey.

QMS's new Magicolor 2 CX is inexpensive and physically attractive, but it suffers from software design flaws and slow text printing. We found both the control panel and the driver software's ten-tab interface difficult to navigate. Equally frustrating is the printed documentation, which covers only setup; for everything else, you must consult a CD-ROM. And though the Magicolor's 0.7-ppm graphics speed is above average, its 3.6-ppm text speed is half that of other color lasers. On the plus side, it is especially easy to set up: Toner cartridges slide into place like drawers in a kitchen cupboard, and the imaging drum moves straight up and down for installation or removal.

With a better driver, the QMS would have a lot to recommend it. It does an excellent job of printing color, with lifelike flesh tones. Its $3200 price ranks among the lowest we've seen for a color laser. And for $1600 more you can turn the Magicolor 2 CX into a color copier with a scanner and document feeder attachment.

THE $3200 QMS MAGICOLOR 2 CX offers subtle color and precise text, but it's fairly slow and its driver design is confusing.

TEKTRONIX'S OLD TECHNOLOGY

IN MARCH, when we first looked at the Tektronix Phaser 360, we couldn't rank it because it had only a beta driver. This month we retested it with its final driver software. Years ago, when color lasers cost double or triple what they do now, Tektronix pioneered the relatively inexpensive solid-wax technology that this machine uses. But today the $3695 Phaser 360 offers no price advantage over color lasers, and its print quality lags far behind. Text looks fuzzy, color graphics appear coarse, and "straight" lines aren't. In short, the Phaser 360's output looks like an inexpensive ink jet's. But then, the 360's default resolution is 300 by 300 dots per inch rather than the 600 by 600 dpi of most color printers today. (You can obtain 800-by-450-dpi resolution on the 360 by using its Enhanced Color Mode option, which we didn't test.)

What did we like about this Tektronix model? It prints color images at a speedy 1.3 ppm, the fastest we've seen. Its documentation is clear and thorough, and installing and using the printer software is simple. And as it has done with its earlier solid-wax printers, the company is offering a lifetime supply of free black ink for the Phaser 360. But if you want top-notch print quality, go with a laser.

MONOCHROME MACHINATIONS

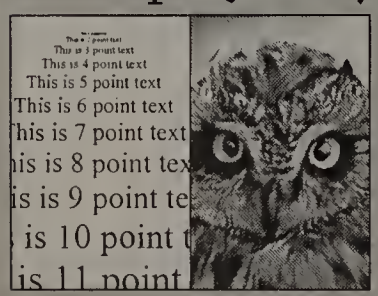
IBM IS RETIRING its Network Printer 12, ranked number four on our monochrome chart in March. That abdication allows Brother's fine HL-1660 to step up from fifth place into fourth, and lands NEC's bargain-priced SuperScript 1260 in the number five spot for the first time since we tested it in September 1997.

The SuperScript 1260 performs almost identically to the discontinued IBM. In a market now dominated by 16- and 17-ppm systems, the NEC's 12-ppm engine is fairly slow: In our tests it printed 8.8 text ppm and just 2 ppm for graphics. Like the IBM, the NEC produces smooth graphics, though text is a bit coarse. Still, if you don't need speed you can't beat the 1260's $699 price. (The $979 SuperScript 1260N adds a network interface card.)

—*Dan Littman* ■

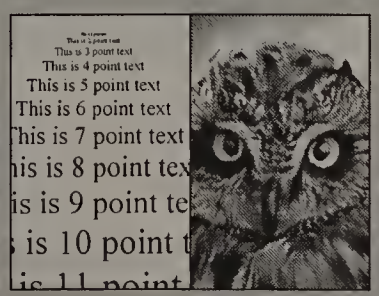
PRINT QUALITY SAMPLES

Top-Quality Text from HP and Minolta



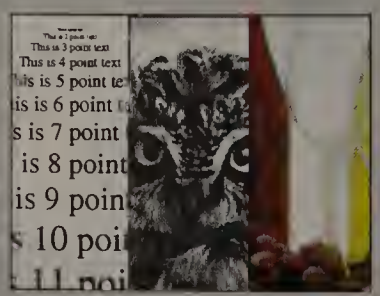
HP LASERJET 4000 TN

We like the crisp text of this Best Buy, though graphic images lose detail at its default settings. The $1599 price is high, but this laser comes loaded with features.



NEC SUPERSCRIPT 1260

Smooth graphics are the hallmark of this monochrome laser. Text is slightly jagged but still acceptable, and for $699 this printer is a steal.



COLOR PAGEWORKS PS

The new PostScript version of Minolta's venerable printer produces rich text and saturated color similar to the Best Buy Epson, but its grays have a gridlike texture.

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PC MAGAZINE EDITORS' CHOICE
December 2, 1997
STB Velocity 128

MVP 1997 PC Computing WINNER

1997 PC GAMES A-List
BEST OF THE BEST

★★★★★ Computer Life

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VELOCITY 128

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GAMEWORTHY cnet www.gamecenter.com

PC WORLD TOP 10 Accelerators

CG CHOICE

PC Computing ★★★★★

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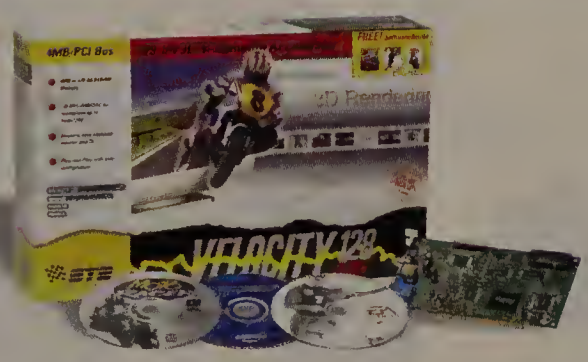
3D WinBench '98 Performance

VELOCITY 128	670
3D Blaster Voodoo2	656
Viper V330	530
XPERT@Play	444
70 Millennium II	



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PC WORLD

TOP 10 MONITORS

	17-INCH MONITORS	Month tested	Street price (2/16/98)	Overall rating	Quality of text/graphics	Comments	Reader service number
1	Mitsubishi Diamond Pro 87TXM 800/843-2515 www.mitsubishi-display.com	Sept 97	$575	88	very good/ very good	**FEATURES:** 15.7-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 107-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 12-hour weekday toll-free support. **PRO:** Sharp text, vivid colors, great controls, color- and image-correction utility. **CON:** Two faint lines visible across screen.	640
2	Iiyama VisionMaster Pro 17 800/394-4335 www.iiyama.com	Sept 97	$639	88	very good/ excellent	**FEATURES:** 15.9-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 12-hour weekday toll-free support. **PRO:** Great graphics, superb text, easy-to-adjust on-screen menus, large viewable area. **CON:** Two faint lines visible across screen.	641
3	ViewSonic PT775 800/888-8583 www.viewsonic.com	Sept 97	$729	87	very good/ excellent	**FEATURES:** 15.9-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 119-Hz refresh rate,[1] Plug and Play ready,[2] TCO'92 compliant, three-year warranty, 11-hour weekday toll-free support. **PRO:** Stunning graphics, crisp text, large viewable area, easy to adjust, color correction. **CON:** Two faint lines on screen.	642
4	Samsung SyncMaster 700b 800/933-4110 www.sosimple.com	Sept 97	$459	85	very good/ very good	**FEATURES:** 15.7-inch viewable area, .28mm dot pitch tube, up to 100-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 24-hour toll-free support. **PRO:** $50 price drop, attractively styled case, equally fine display of text and graphics, basic controls are easy to adjust. **CON:** Cryptic menu icons.	643
5	Samsung SyncMaster 700p 800/933-4110 www.sosimple.com	Jan 98	$589	85	very good/ very good	**FEATURES:** 15.3-inch viewable area, .26mm dot pitch tube, up to 105-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour toll-free support. **PRO:** Sharp styling, well-focused picture, easily adjustable with plain-language menus. **CON:** Cryptic menu icons, relatively small viewable area.	644
6	KDS Visual Sensations VS-9 800/237-9988 www.kdsusa.com	Jan 98	$495	84	very good/ good	**FEATURES:** 15.7-inch viewable area, .26mm dot pitch tube, up to 120-Hz refresh rate,[1] Plug and Play ready,[2] three-year warranty, 11-hour weekday toll-free support. **PRO:** $55 price cut, above-average text, intuitive controls, high refresh rate. **CON:** No numerical calibrations for adjustments, menus available only in English.	645
7	Panasonic PanaFlat PF70 800/742-8086 www.panasonic.com/alive	Jan 98	$749	83	very good/ excellent	**FEATURES:** 15.6-inch viewable area, .24mm slot pitch tube, up to 106-Hz refresh rate,[1] Plug and Play ready,[2] TCO'92 compliant, three-year warranty, 24-hour toll-free support. **PRO:** $100 price drop, impeccable focus, flat screen reduces reflections. **CON:** Initial impression of bowed lines (goes away in a few days), expensive.	646
8	Compaq V75 800/345-1518 www.compaq.com	NEW	$529	83	very good/ very good	**FEATURES:** 15.7-inch viewable area, .26mm dot pitch tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour toll-free support. **PRO:** Fine picture, a year of on-site service, easy basic adjustments. **CON:** No numeric calibrations for gauges, must press save button to store changes.	647
9	AcerView 79g 800/733-2237 www.acer.com	Mar 98	$699	83	very good/ excellent	**FEATURES:** 15.5-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 110-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour toll-free support. **PRO:** Colorful and realistic graphics, sharp text, easy menus. **CON:** Toll support after first year, two faint lines across screen.	648
10	TeleVideo SVP270 800/835-3228 www.televideoinc.com	NEW	$650	83	very good/ excellent	**FEATURES:** 15.4-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 119-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 10.5-hour weekday toll-free support. **PRO:** Fantastic graphics, crisp text, exceptionally adjustable. **CON:** Two faint lines across screen, relatively small viewable area.	649

Best Buy online For reviews of products that didn't make the chart, visit www.pcworld.com/t10monitors. All products: 905

HOW WE TEST Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, a newsletter, spreadsheets, Web pages, and scanned images. The overall rating is based on text and graphics quality (25 percent each), features and ease of use (25 percent), price (20 percent), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

[1] Highest refresh rate at 1024 by 768 resolution. [2] Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play.

OUR BEST BUYS REMAIN unchanged from March, with Mitsubishi's and Iiyama's units still on top. The lowest-priced monitor here is Samsung's SyncMaster 700b, a fine business model for just $459. Two new monitors make the chart this month. Compaq's moderately priced V75 earns eighth place. TeleVideo's SVP270 debuts at number ten—its small viewable screen and short support hours keep it from ranking higher. ■

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PC WORLD

TOP 10 GRAPHICS BOARDS

	GRAPHICS BOARDS	Month tested	Street price (2/17/98)	Overall rating	PC WorldBench graphics score/ rating	3D rating	Multimedia rating	Comments	Reader service number
1	ATI 3D Pro Turbo PC2TV 905/882-2600 www.atitech.com	Oct 97	$219	97	189/ very good	good	outstanding	**FEATURES:** 8MB of SGRAM, 200-MHz RAMDAC, ATI Rage II chip, software for 3D modeling, image editing, and VRML. **PRO:** Terrific multimedia performance, nice 3D, connects to a TV. **CON:** Expensive, mediocre video playback, no toll-free support.	630
2	ATI Xpert@Work 905/882-2600 www.atitech.com	Dec 97	$139	97	191/ outstanding	good	good	**FEATURES:** 4MB of SGRAM (upgradable to BMB), 230-MHz RAMDAC, ATI Rage Pro chip, photo editing and 3D modeling software. **PRO:** $30 price drop, fast all around, great utilities, connects to a TV. **CON:** So-so 3D image quality, no toll-free support.	631
3	Hercules Thriller 3D 800/532-0600 www.hercules.com	Mar 98	$129	96	188/ very good	very good	poor	**FEATURES:** 4MB of SGRAM, 220-MHz RAMDAC, Rendition Verite V2200 chip, no software. **PRO:** Great price, above-average 3D and decent 2D performance, toll-free support. **CON:** Slow AVI video playback, no weekend support.	632
4	STB Nitro 3D 800/234-4334 www.stb.com	Dec 97	$99	95	190/ outstanding	adequate	adequate	**FEATURES:** 4MB of EDO DRAM, 170-MHz RAMDAC, S3 Virge/VX chip, bundled 3D games. **PRO:** Least-expensive board on chart, speedy 2D, toll-free support, lifetime warranty. **CON:** 3D image quality is below average.	633
5	ATI 3D Xpression+ PC2TV 905/882-2600 www.atitech.com	Oct 97	$115	94	190/ outstanding	adequate	adequate	**FEATURES:** 4MB of SGRAM, 170-MHz RAMDAC, ATI Rage II chip, bundled 3D games plus 3D modeling, image editing, and VRML software. **PRO:** Good 2D, speedy 3D, nice bargain, connects to a TV. **CON:** Mediocre video playback, no toll-free support.	634
6	STB Velocity 128 800/234-4334 www.stb.com	Nov 97	$179	94	189/ very good	very good	adequate	**FEATURES:** 4MB of SGRAM, 230-MHz RAMDAC, NVidia Riva 128 chip, bundled 3D games and 3D image editing software. **PRO:** Excellent 3D image quality, strong 2D performance, good game software. **CON:** Poor AVI video playback.	635
7	Diamond Stealth 3D 2000 Pro 800/468-5846 www.diamondmm.com	Jan 98	$135	93	191/ outstanding	good	very good	**FEATURES:** 4MB of EDO DRAM, 170-MHz RAMDAC, S3 Virge/DX chip, bundled 3D game, multimedia encyclopedia, and photo editing software. **PRO:** Great 2D, fast 3D, near-perfect AVI video playback, inexpensive. **CON:** No toll-free support.	636
8	Hercules Terminator 3D/DX 800/532-0600 www.hercules.com	Oct 97	$109	93	189/ very good	adequate	very good	**FEATURES:** 4MB of EDO DRAM, 170-MHz RAMDAC, S3 Virge/DX chip, bundled 3D games. **PRO:** Inexpensive, quick in multimedia programs, excellent AVI video playback, toll-free support. **CON:** Subpar 3D quality overall, driver bug in Terracide game.	637
9	Hercules Dynamite 3D/GL 800/532-0600 www.hercules.com	NEW	$185	92	191/ outstanding	good	adequate	**FEATURES:** 4MB of SGRAM, 250-MHz RAMDAC, 3DLabs Permedia 2 chip, plus 3D modeling, image editing, and game software. **PRO:** Good 3D and 2D performance, toll-free support. **CON:** Disorganized utilities, AVI video playback is choppy.	638
10	Hercules Stingray 128/3D 800/532-0600 www.hercules.com	Oct 97	$209	91	184/ very good	very good	poor	**FEATURES:** 4MB of EDO DRAM, 180-MHz RAMDAC, Alliance ProMotion-AT3D chip, 3Dfx Voodoo Rush 3D chip set, bundled games. **PRO:** Terrific 3D image quality, toll-free technical support. **CON:** Pricey, slowest 2D performance on chart.	639

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10graphics. All products: 904

HOW WE TEST We tested PCI boards under Windows 95 with PC WorldBench 1.0 at 800 by 600 resolution and 16.8 million colors, at 1024 by 768 and 65,536 colors (reported here), and at 1280 by 1024 and 65,536 colors. The 3D score is based on frame rates in our VRML and 3D game tests and on subjective ratings in three games. The multimedia rating is based on frame rates in our Macromedia Director and AVI playback tests, and on timed scores in our PowerPoint multimedia presentation tests. Boards were tested in a Dell Dimension XPS P133c with 32MB of EDO DRAM and 256KB of pipeline-burst secondary cache. The overall rating is based on performance (40 percent), features (30 percent), price (20 percent), and support policies (10 percent). For all scores, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

THIS MONTH a $30 price drop earns the ATI Xpert@Work a Best Buy. We also tested a new Hercules Dynamite 3D/GL board with 4MB of RAM, which competed against its 8MB sibling. The 4MB 3D/GL isn't as strong in multimedia and 3D as the 8MB version, but it's $64 cheaper so wins out. It even moves a notch up the chart from the 8MB model's tenth-place slot last month. New boards from ATI, Jccom, and Koutech didn't earn positions. ■

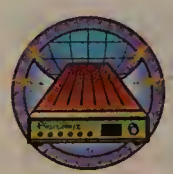
PC WORLD

TOP 10 MODEMS

	INTERNAL MODEMS	Month tested	Street price (2/24/98)	Overall rating	Average transfer time per MB (min:sec)	Comments	Reader service number
1	IBM 56K Modem Internet Kit 800/772-2227 www.pc.ibm.com	Nov 97	$135	81	2:39/3:17 [1]	**FEATURES:** 56-kbps (x2), 8-bit ISA card, 115.2-kbps PC-to-modem speed, V.8D, distinctive ring, voice mail, speakerphone, DSVD, Caller ID, QuickLink Message Center software. **PRO:** Rich features, only vendor to offer 24-hour support. **CON:** Slow 56-kbps download, free upgrade to 56-kbps standard only if through software.	–
2	Diamond Multimedia SupraExpress 56i Sp 800/727-8772 www.diamondmm.com	Jan 98	$119	79	2:48/3:04 [1]	**FEATURES:** 56-kbps (K56flex), 16-bit ISA card, 230.4-kbps PC-to-modem speed, V.80, distinctive ring, voice mail, speakerphone, Caller ID, microphone, audio cable, COMit and FaxTalk software. **PRO:** Feature-laden, smooth install, $20 cut. **CON:** Slow 33.6-kbps rate, free upgrade to 56-kbps standard only if through software.	664
3	3Com Courier V.Everything 56K Internal 800/877-2677 www.3com.com	Nov 97	$260	79	2:33/2:57 [1]	**FEATURES:** 56-kbps (x2), 8-bit ISA card, 230.4-kbps PC-to-modem speed, distinctive ring, callback, Caller ID, RapidComm software. **PRO:** Fast performer, toll-free support, free upgrade to 56-kbps standard even if modem swap is required. **CON:** Most expensive on chart, support available weekdays only.	665
4	Zoom FaxModem 56K 800/631-3116 www.zoomtel.com	retested this month	$119	79	2:38/3:15 [1]	**FEATURES:** 56-kbps (K56flex), 16-bit ISA card, MNP-1DEC error control, 230.4-kbps PC-to-modem speed, V.80, distinctive ring, CDMit and WinFax Lite software. **PRO:** Saturday support, easy install with firmware revision, free upgrade to 56-kbps standard even if modem swap required. **CON:** Support call is on your dime, sluggish.	666
5	Shark Multimedia Leopard 56K 800/800-3321 www.sharkmm.com	Jan 98	$90	78	2:38/3:04 [1]	**FEATURES:** 56-kbps (K56flex), 16-bit ISA card, MNP-1D error control, 115.2-kbps PC-to-modem speed, V.8D, distinctive ring, voice mail, speakerphone, VoiceView, ASVD, Caller ID, microphone, DialTone software. **PRO:** Good features, cheap. **CON:** No weekend support, free upgrade to 56-kbps standard only if through software.	667
6	Wisecom Accelerator Pro 56K Internal Voice Modem 888/947-3266 www.wisecominc.com	Jan 98	$99	77	2:40/3:09 [1]	**FEATURES:** 56-kbps (K56flex), 16-bit ISA card, 115.2-kbps PC-to-modem speed, voice mail, speakerphone, DSVD, ASVD, Caller ID, SuperVoice software. **PRO:** Affordable, voice features, toll-free support. **CON:** Documentation too technical, short support hours, free upgrade to 56-kbps standard only if through software.	668
7	NewCom 56K IFX Internal Data/Fax Modem 800/563-9266 www.newcominc.com	Mar 98	$99	77	3:25/3:16 [1]	**FEATURES:** 56-kbps (x2), 16-bit ISA card, 115.2-kbps PC-to-modem speed, distinctive ring, voice mail, speakerphone, VoiceView, password protection, Caller ID, QuickLink II software. **PRO:** Low price, toll-free support includes weekends. **CON:** Slowest on chart, free upgrade to 56-kbps standard only if through software.	669
8	3Com U.S. Robotics 56K Faxmodem 800/342-5877 www.3com.com	Sept 97	$160	76	2:31/3:16 [1]	**FEATURES:** 56-kbps (x2), 8-bit ISA card, 115.2-kbps PC-to-modem speed, distinctive ring, Caller ID, RapidComm software. **PRO:** Documentation is thorough and easy to read, free upgrade to 56-kbps standard even if modem swap is required. **CON:** Expensive, no weekend tech support.	670
9	Hayes Optima 33.6 Internal Business Modem 800/377-4377 www.hayes.com	July 97	$189	76	2:31	**FEATURES:** 33.6-kbps, 16-bit ISA card, flash ROM, 230.4-kbps PC-to-modem speed, distinctive ring, voice mail, callback, password protection, Caller ID, SmartCom Message Center LE software. **PRO:** Fast performer, good security features. **CON:** Pricey, no weekend support, long 8.5-inch card may block other components.	671
10	Cardinal Connecta 56K Internal Fax Modem 800/775-0899 www.cardtech.com	Sept 97	$139	76	2:58/3:08 [1]	**FEATURES:** 56-kbps (x2), 8-bit ISA card, 115.2-kbps PC-to-modem speed, FaxTalk Plus software. **PRO:** Fast 56-kbps downloads, very good documentation, easy installation, free upgrade to 56-kbps standard even if modem swap is required. **CON:** Slow 33.6-kbps performance, sparse features.	672

Best Buy online For reviews of products that didn't make the chart, visit www.pcworld.com/t10modems. All products: 907

HOW WE TEST We test 33.6-kbps modem-to-modem performance using a pair of identical modems on a Telecomm Analysis Systems simulated phone network. It sends a text file over 55 line conditions, and a mix of four files—graphics, text, program, and compressed files—over one line condition. For our 56-kbps tests, we call a local Internet service provider access number and transfer .jpg, .doc, and .zip files continuously over an 18-hour period. The times to transfer a megabyte of data are usually lower in the TAS test than in the ISP test because the files used in the latter are less compressible. Results for the two tests are not comparable. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. [1] V.34 TAS transfers/56-kbps ISP downloads.



WITH DROPPING PRICES and faster speeds, 56-kbps modems now outrank almost all 33.6-kbps units we've tested. In fact, only one 33.6-kbps modem makes the chart: Hayes's Optima 33.6. Zoom's FaxModem 56K—retested with new firmware—and Diamond's SupraExpress 56i Sp move up a notch thanks to easier installation and a $20 price cut, respectively. Two new modems from Boca did not make the list, due to scant features and mediocre support. ■

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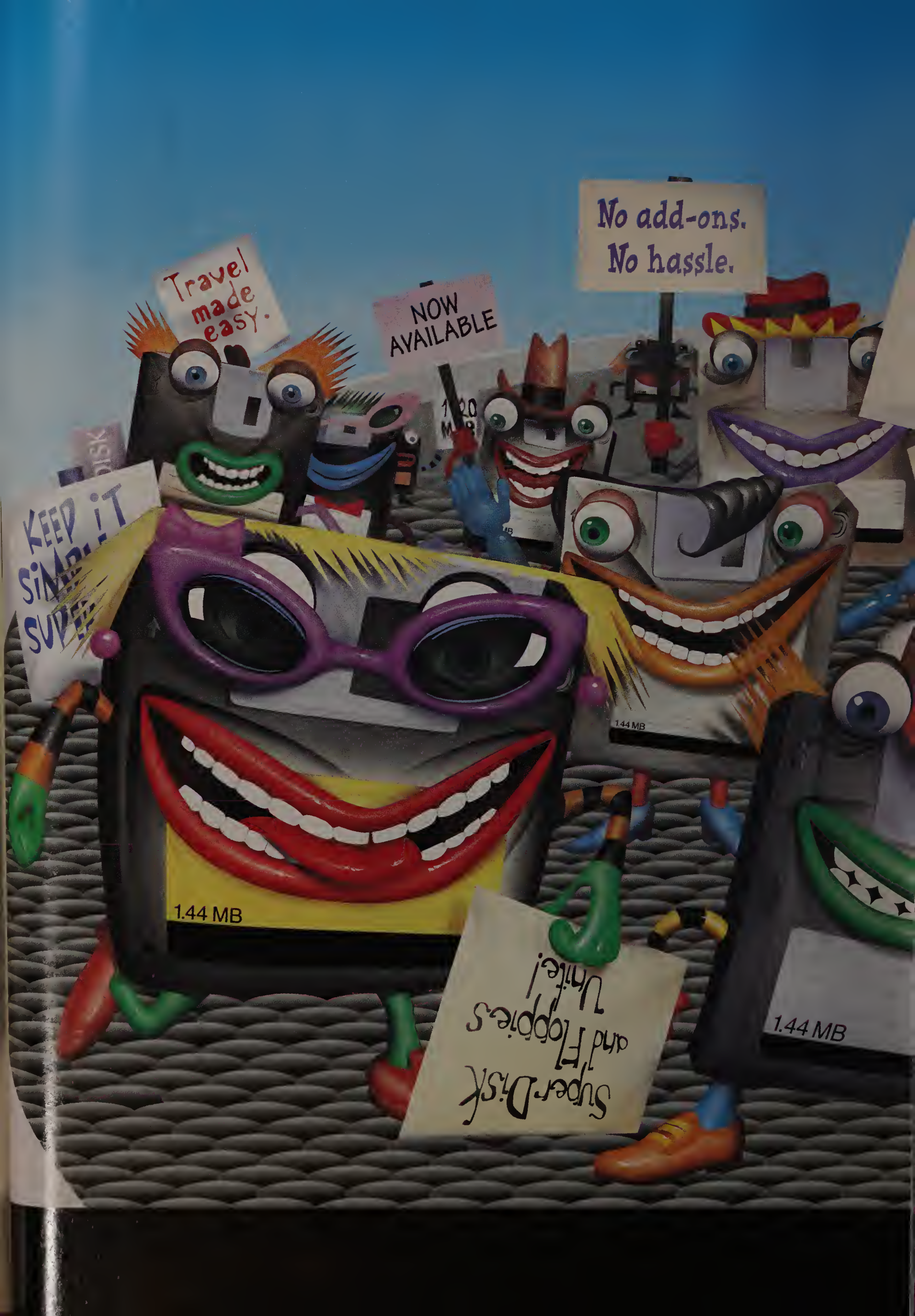
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PC WORLD @HOME

We Shoot Pictures, Don't We?

BOY. YOU GOOF UP one time and you hear about it forever. In my case, it was the day my wife went into labor with our first child 11 years ago. Unfortunately, I didn't have any film for the camera, so we had to stop at a 7-Eleven on our way to the hospital.

I haven't forgotten that little stop. My wife won't let me. Three kids and thousands of pictures later, I'm thinking there has to be a better way to capture life's important moments. After all, a computer replaced my Royal typewriter. My CD player replaced my phonograph. Maybe I should do away with the whole film developing process. Maybe I should go digital.

With that in mind, I looked at a range of digital cameras as well as software that lets me enhance my photos and then put an ink jet and a photo printer to work.

FILM AT ELEVEN—NOT!

THE LURE OF a digital camera is hard to resist. No film to forget. No rolls to develop. No shots of my youngest son's gymnastics meet that come out so dark they look like stills from a third-rate ninja flick. Plus, with the right printer you get instant gratification—and there's no detour to the drugstore picture counter.

Several fine digital cameras are on the market, but Ricoh's **RDC-300Z** will appeal to any part-time paparazzo. It's light-years ahead of my trusty Pentax K-1000, a 35mm camera that's about as automatic as a 1953 Renault.

The Ricoh's zoom features, for example, let me easily zero in for action shots of my oldest son's tae kwon do bouts. I sat safely in the stands, watching through the flip-up 1.8-inch color LCD. When I zoomed in, the screen put me right on top of the action. And when I accidentally shot the back of some guy's head instead of my son landing a kick, I didn't have to wait for the photo lab to show me the potential Rogaine commercial. I just hit the delete button and snapped another shot.

A big drawback is that sunlight renders the LCD useless. But indoors, at its highest-quality setting, the RDC-300Z produces great images, with a good balance of color and contrast and plenty of detail.

Here's the best part: While my roll of Kodak Gold sat in the drugstore developer's bin, I hooked up the Ricoh's video output to the TV and presented an instant martial arts slide show to the rest of the family. From hookup to viewing, the process took about half a minute, versus the couple of days it takes to get prints developed without a rush fee.

At a list price of $599, the Ricoh is priced competitively with similarly equipped digital cameras from other manufacturers, but it's still a little out of my price range. So I put my hands around the Epson **PhotoPC 550.** Could this $299 snapper, only a little thicker than a deck of cards, get me started without breaking the bank? Yes—if I made some sacrifices.

Unlike the RDC-300Z, the PhotoPC 550 has no built-in flash—a shortcoming ▶

EDITED BY
Angela Freeman, Anne Kandra, and Scott Spanbauer

ILLUSTRATION: JEFF BERLIN

I regretted when my youngest son (the future gold medal gymnast) climbed up one of our magnolia trees. I rushed out with both my Pentax and the PhotoPC 550 in hand, and discovered that the only clear shot put the sun at his back. I used a flash with my Pentax to compensate for the backlight, but the Epson unit didn't give me that option.

Indoors, it didn't fare well either. Since the PhotoPC 550 lacks any way to control the shutter speed or to add light (both of which my Pentax can do), the interior images often came out too dark or too light or too red or too *something*.

HOT SHOT: The LCD screen on the Ricoh RDC-300Z is a bonus.

The high-end Epson **PhotoPC 600** doesn't demand the same sacrifices that the 550 does; but for $699, it shouldn't. The unit comes with an LCD viewer, a zoom feature (not a true zoom lens, but digital amplification that decreases the picture's resolution as it magnifies), a flash, and a panorama mode. Still, I could buy a lot of lenses and film for that price.

STEP INTO MY (PHOTO) LAB

I KNEW SWITCHING from film to digital would mean becoming my own film lab. After shooting the pictures, I wanted to turn them into something totally original—or at the very least, fix any mistakes.

Like its instant cameras, Polaroid's $59.95 **PhotoMax Image Maker** software is straightforward, but its simplicity comes with limitations. The package offers six picture-centric programs from one interface, but unlike with Adobe's PhotoDeluxe or Microsoft's Picture It, they aren't very well integrated. PhotoMax's best tool is an automatic photo fixer: With just a few clicks I could adjust contrast, brightness, and hue to give my admittedly less-than-perfect photos a second chance.

In less than 30 minutes I was using PhotoMax's simple editing tools to crop and resize a picture of my wife and me at a holiday party. It took me a little bit longer to figure out how to use some of the advanced features, however, such as the digital airbrush for eliminating flaws.

Compare that process with fixing and editing the pictures I shoot on film using my regular, old-fashioned camera. Unless I scan them into my computer, I'm out of luck.

If I were a professional photojournalist, maybe I would have my own developing room. But I'm not. If I want to crop a film photo, I pull the scissors out of the kitchen drawer. If a picture is too dark or the people in it have red eyes, I either live with it or throw it away.

THE CALL OF THE WIDE

MY PHOTO ALBUM is filled with scenic views taken during hikes and road trips. But capturing the sweep of the Blue Ridge mountains in a 4-by-6-inch print is like sticking a hippo in a Jacuzzi. It can be done, but it's not pretty.

So I tried out a digital solution: Enroute Imaging's **QuickStitch.** As its name implies, this program lets you "stitch" photographs together to create one larger image, either tall or wide. I got mixed results with it, mostly because I didn't plan ahead. It's not that the QuickStitch software is difficult to use. In fact, it's devilishly simple.

For this experiment, I shot several scenes overlooking a tree line from my backyard. Once the images were in my PC, I opened the folder of photos in QuickStitch's Explorer-like pane on the left, chose the images I wanted, and dragged them to the editing grid on the right. I then selected the settings for stitching the photos together. But to reproduce the landscape as I'd seen it, I should have mounted the camera on a tripod to capture images with just the right amount of overlap.

To its credit, QuickStitch provides plenty of picture-taking hints. And my ▶

PHOTOPC 550: It's affordable, but short on features.

Scorecard

Ricoh RDC-300Z
Grade: **B+**; Price: $599 list; Ricoh Consumer Products; 800/225-1899; www.ricohcpg.com
READER SERVICE NO. 702

PhotoPC 550
Grade: **C-**; Price: $299 street; Epson America; 800/463-7766; www.epson.com

PhotoPC 600
Grade: **B-**; Price: $699 street; Epson America; 800/463-7766; www.epson.com

PhotoMax Image Maker
Grade: **B**; Price: $59.95 list; Polaroid; 800/343-5000; www.polaroid.com
READER SERVICE NO. 705

QuickStitch
Grade: **C+**; Price: $39.95 list; Enroute Imaging; 650/843-1122; www.enroute.com
READER SERVICE NO. 706

Ricoh RXP-10 Digital Color Printer
Grade: **C**; Price: $599 list; Ricoh; 800/225-1899; www.ricohcpg.com
READER SERVICE NO. 707

Canon BJC-7000
Grade: **A**; Price: $349 street; Canon Computer Systems; 800/848-4123; www.ccsi.canon.com
READER SERVICE NO. 708

F Y I

NOT EVERY newcomer to the Internet sticks around. According to a new survey, 15.9 million U.S. adults who tried using the Internet during the past year report that they are no longer online.

SOURCE: CYBERDIALOGUE

PHOTOGRAPHS: KEVIN CANDLAND; ILLUSTRATION: GREG CLARKE

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Circle 242 on reader service card

RETOUCHED BY AN AMATEUR: Polaroid's PhotoMax software makes it easy to enhance your photos.

experiment shows one advantage of using a digital camera: I didn't have to throw away several rolls of film when I found I hadn't taken the pictures properly.

FORMERLY KNOWN AS PRINTS

BY THIS TIME I had stuffed a boatload of JPEG images into my PC, and I'd done more cropping and cutting than a Beverly Hills plastic surgeon. Now, to be my own photo lab, I needed a printer. Buying a printer just for photos sounds extravagant, and it is. So if I'm going to drop a chunk of change on a gadget that does only one thing, it had better be darn good.

I unpacked Ricoh's **RXP-10 Digital Color Printer** with high hopes. And while this $599 device did yield impressive output with rich colors, it didn't quite match the clarity of developed film prints. I could see some subtle differences in the slightly pixelated edges between foreground and background objects.

The RXP-10 has one feature that almost makes it worth the money: A connection between the printer and the RDC-300Z digital camera let me bypass the PC. And though it couldn't produce film-quality prints, the RXP-10 gave me shots that I was proud to mail to relatives. I could even make photo labels with adhesive paper.

When it comes down to it, if I were really spending this kind of money I'd get a good color ink jet. Canon's $349 **BJC-7000** (see Top 10 Printers, April) is a better choice than the photo printer. Not only does it print photos that look great, but I can also use it for home-office printing.

My experiment over, I faced a decision: Go digital and kiss the film world goodbye? I'm not puckering up yet. The lure of a digital photo lab is all about instant gratification. Unfortunately, right now it's not worth the money. I can shoot as many pictures with my Pentax as I want. Flash batteries and 35mm film are a lot cheaper than photo ink cartridges, digital camera batteries, and glossy paper. Supermarkets offer enlargements and reprints at low prices. So I'm hanging on to my Pentax. Okay, I won't be as cool as my neighbor with the digital camera. Just richer.

PHOTO FINISH: The Ricoh RXP-10 prints nice photos, but $599 is a lot to pay for a gadget that does only one thing.

Pete Scisco is a freelance writer living in Winston-Salem, North Carolina. ■

F Y I

FRESH AIR and exercise be damned: A new survey says that PC and video-game console owners spend an average of 7.4 hours a week playing computer games—second only to TV watching among their leisure activities.

SOURCE: INTERACTIVE DIGITAL SOFTWARE ASSOCIATION

KEEPING UP

No-Hassle Newsgroups

IF YOU'VE EVER spent time in an Internet Usenet newsgroup, you know how confusing they can be. To avoid frustration and get to the good stuff, try the new My Deja News feature at Deja News (www.dejanews.com). It provides a straightforward browser-based interface, weeds out junk mail, and best of all, makes it easy to find discussions that match your interests, whether you're a Quattro Pro user or a breeder of Italian greyhounds.

Disks for Kids

HERE'S A RARE chance to clear off your desk and do some good at the same time. A nonprofit service called Floppies for Kiddies will distribute your unwanted 3.5-inch disks to students around the country. No time to reformat? Send them as is; the service will wipe them clean before sending them to schools. Mail your disks to USA CityLink/Floppies for Kiddies, 20349 Highway 36, Covington, LA 70433. For further information, visit www.usacitylink.com/citylink/disks.

Rate the Flicks

WHY SHOULD Siskel & Ebert have all the fun? Unleash your inner film critic at FlickPicks (www.flickpicks.com), where you can rate and post comments on current movies. The site's visitors aren't pushovers—sharp critiques abound, and many films average no more than a star or two.

Newfangled Nuptials

IT MAY NOT have the cachet of Waterford crystal, but MGI Software's PC Wedding Kit makes a fun gift for folks planning to get hitched. The $40 package lets the happy couple create everything from calendars to on-screen photo albums and custom wine-bottle labels. Though the software can be used with a digital camera (another intriguing gift idea), it also includes coupons for free transfer of 35mm photos to floppy disk.

—Harry McCracken

PHOTOGRAPH: KEVIN CANDLAND; ILLUSTRATIONS: GREG CLARKE

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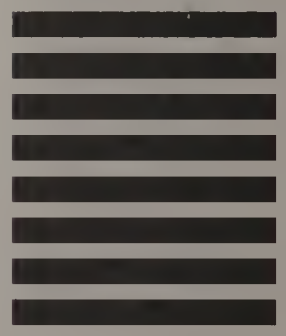

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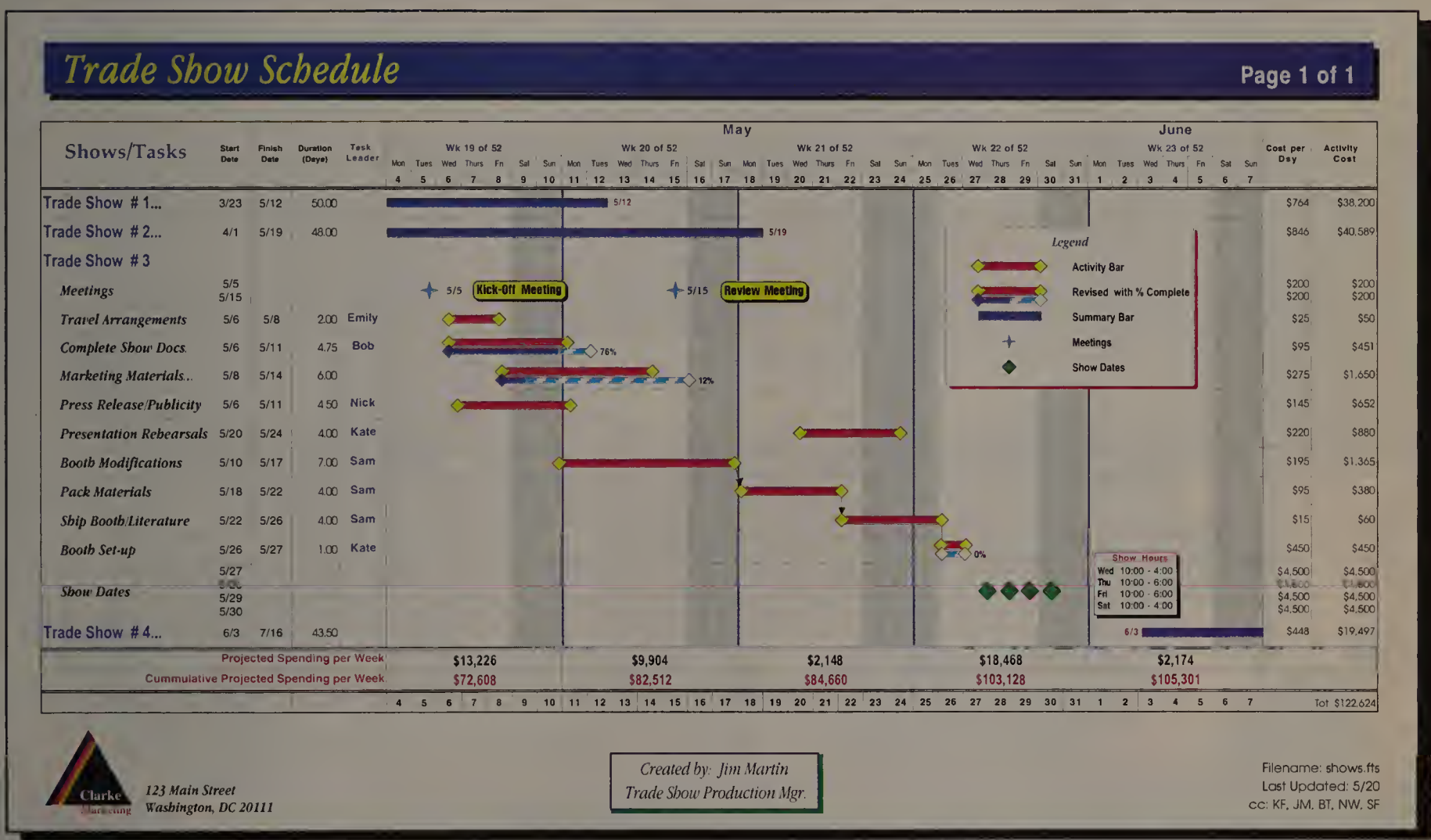

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Dishing the Dirt on Satellite Surfing

"I'M TWEAKING the azimuth," I hollered to my neighbor. I was on the roof, balancing myself against the chimney. I had a wrench in one hand, a manual in the other, and I was cursing vigorously.

My editor knew I was an Internet cowboy. I already had an ISDN line capable of butt-kicking speed—128 kilobits per second. He wanted to know if I'd be willing to try faster satellite access. "Yep," I said, taking an entire nanosecond to decide.

Now, with six months of satellite service under my belt, I can tell you that its speed is utterly stunning. Netscape Navigator's download gauge once clocked a .zip file's speed at an astonishing 57 kilo*bytes* per second. The same file transferred at 14 KBps over my ISDN link, and at a paltry 4.6 KBps using a 56-kbps modem.

There's more to the story, though, and it's not all good.

UP ON THE ROOF

HUGHES NETWORK SYSTEMS' DirecPC satellite dish is a 21-inch elliptical antenna that looks like the TV dishes found on finer roofs everywhere. The apparatus, which costs about $300, includes software, a mounting kit, and a PCI card. For $100 extra, I opted for the DirecDuo model—an extra device on the dish receives digital television signals from a second satellite.

Keep your checkbook handy, though, because you'll need to install the dish as well. Since I'm not as handy as I look, I ended up watching two Hughes guys spend 4 hours on the installation. A simple one can cost as little as $100, but in my case wires had to run through my home's crawl space and attic, so the installation cost about $400.

> Netscape **Navigator** clocked a **.zip file** at an astonishing 57 kilo**bytes** per second.

And that's not the only extra cost. You'll still need an Internet service provider, along with a phone line. That's because the DirecPC dish is one-way: When you ask your browser to download a file or a Web page, the request goes to your ISP by modem. The satellite then beams the data you requested down to your dish.

Naturally, you'll have to pay a monthly charge to Hughes as well as to your ISP. Hughes's fees range from $20 a month for off-peak times to $130 for round-the-clock service. By comparison, ISDN service costs me about $40 each month (prices vary by region).

Getting DirecPC's software and card configured and working on my Windows 95 system was a lengthy and anguishing experience. A new version may alleviate the problem for future buyers, but I could not get my hands on the latest software in time for this column.

I also had to fiddle with Windows 95's networking configuration, messing with (and messing up) settings and addresses. After days of major futzing—and with the help of Hughes engineers—I finally had a strong, solid connection.

MOVE OVER, ISDN

I SAW A remarkable—no, unimaginable—speed difference with most of the Web sites I visited. It was like switching channels on TV: Images appeared almost instantly. But the mileage varied depending on the site. The dish couldn't make slow sites faster, and it's not immune to the typical Internet logjams. Sometimes downloads hiccuped or stalled for seconds at a time. Even rain can interfere with the signal. "The column is late because of El Niño," I told my editor. And it was true.

Should you consider DirecPC? Definitely. If ISDN or cable modems are too pricey or are unavailable where you live, the dish may be your best choice. But if you mostly send and receive e-mail and only occasionally surf the Web, stick with a modem.

Still not sure? Do yourself a favor and check the alt.satellite.direcpc newsgroup and the unofficial DirecPC site at www.wojo.com/direcpc. Also, "Bandwidth on Demand" in the August 1997 issue and "Satellites, Radio, and Super Wireless for New High-Speed Net Access" in October 1997's *Top of the News* provide further details; both are available at PC World Online at www.pcworld.com.

Meanwhile, the cable company is working on cable modem access. Stay tuned.

•**DirecPC** (Internet access only) $299 list; **DirecDuo** (TV signal, Internet access) $399 list; **Full DirecDuo** (TV signal, DSS receiver, Internet access) $599 list; Hughes Network Systems; 800/347-3272; www.direcpc.com

READER SERVICE NO. 673

For more articles on high-speed Internet access, visit www.pcworld.com. Contributing Editor Steve Bass is a licensed marriage and family therapist and president of the Pasadena IBM Users Group. See page 14 for contact information. ■

ILLUSTRATION: GREG CLARKE

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HERE'S HOW

ANSWER LINE

Should You Buy a PC From a Local Store?

I TEND TO PURCHASE COMPUTER CLONES built by local mom-and-pop stores rather than brand-name computers. Do you think that it's a mistake to purchase a system with brand-name components from one of the local storefronts instead of spending $200 to $300 more for one of *PC World*'s Top 20 systems? In other words, is it likely that what I'm saving in dollars I'm losing in performance?

Michael Blessing, Saugus, California

YOU'RE PROBABLY NOT losing much performance, but you could be spending more on aspirin. As a longtime owner of both brand-name and store-built computers, I've found that the latter generally produce more headaches (see **FIGURE 1**).

The pain of owning a clone may be worth it if you know what you're doing. Even mail-order companies like Dell and Gateway, which build each computer to order, don't offer the range of options available from a local store, which will generally sell you whatever monitor, speakers, graphics card, and motherboard you ask for. And as you point out, locally built clones generally run $200 to $300 less than equivalently configured brand-name computers.

The problem with local clones is that they're usually not as carefully designed and tested as big-name products. A company that puts the same BIOS, graphics card, and motherboard into tens of thousands of computers is bound to find and correct incompatibilities. Also, a name-brand PC is friendlier. It usually comes with clear setup instructions and preinstalled applications.

Local stores are more likely to cut corners. For instance, my locally built Pentium MMX-166 is a good machine, but its power supply sounds like a 747. It also came without an IBM mouse port—a $6 attachment I had to buy separately and install myself. And of course, a small store is more likely to go out of business, leaving you without support.

If you're technically savvy, shop carefully for a store with good support and cooperative employees, and have the chutzpah to demand exactly what you want, you can get a good bargain from a local store. Otherwise, you're probably better off sticking with the national companies.

FRAZZLED ON DEFRAGGING

MOST ARTICLES I'VE read about computer maintenance recommend periodic hard drive defragging. But I heard that defragging wears out the hard drive. Is this true? And if some defragging is good, is too much defragging bad?

Neil Hovis, San Luis Obispo, California

SINCE I'VE WRITTEN a good many articles recommending regular defragging, this question had me a bit concerned. So I consulted every source I have and ended up with these answers: Yes, you definitely should defrag your hard drive regularly. And though you might damage your hard drive with too much defragging, you'd have to do an awful lot to reach that point.

As you use a hard drive, the files on it become fragmented—with pieces scattered all over the drive. Fragmented files slow down the drive and increase the likelihood that data will be lost or corrupted. A defragging program reassembles the pieces, making each file a contiguous whole. Windows comes with such a program, Disk Defragmenter; Norton Utilities and Nuts & Bolts offer better ones.

By Lincoln Spector

ILLUSTRATION: RICHARD DOWNS

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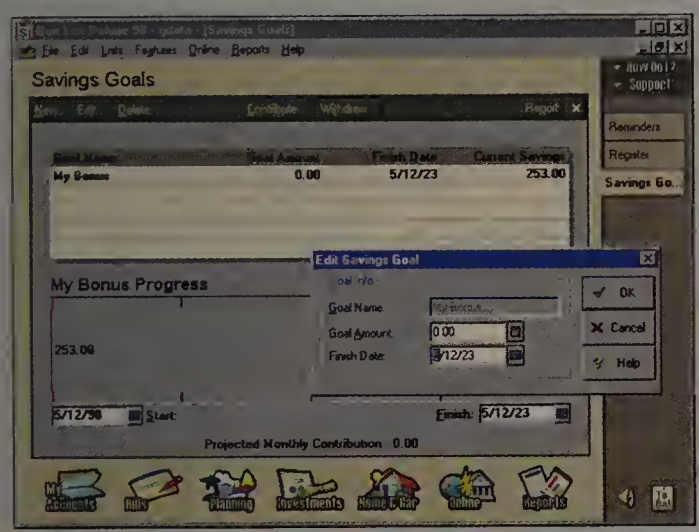

However, the act of defragging gives the drive's moving parts a considerable workout, and moving parts do wear out. If a drive is on its last legs, a defrag operation might push it over the edge. But in such a case, the crash probably would have happened soon anyway.

In most cases, regular defragging actually reduces the wear and tear a drive suffers during normal use. After all, it's easier for the drive head to retrieve a file from one location than from eight. Consequently, a drive that's defragged every two to four weeks should last longer than one that's never defragged.

•**Norton Utilities 3.0 for Windows 95** $79 street; Symantec; 800/441-7234; www.symantec.com

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MOVING WEB FAVORITES

I RECENTLY BOUGHT a new computer and would like to move (via floppy disk) all my favorite sites to the new unit. How do I go about doing this?

John Pilger, Atlanta

YOUR USE OF THE WORD "favorite" suggests that you use Internet Explorer and want to move the shortcuts on the Favorites menu to your new computer. Just to be safe, though, I'll explain how to do this in IE, in Netscape Navigator, and in Netscape Communicator.

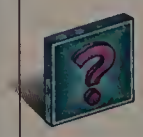
In Internet Explorer, each site listed on the menu represents an individual shortcut file in your Favorites folder, which is probably—but not necessarily—C:\Windows\Favorites. The Favorites submenus are folders within the Favorites folder containing more shortcuts. To move the information to another computer, just copy this folder.

Put a freshly formatted floppy in drive A:. In Explorer, go to your Favorites folder. Press **<Ctrl>-A** to select all the files and subfolders; then right-click the highlighted multitude and select *Send To•3½ Floppy (A)* from the resulting menu.

When the copying is done, bring the floppy to your new PC. If you haven't already installed Internet Explorer onto the new system, do so now. To complete this process, copy the contents of the floppy into the new PC's Favorites folder.

If you use Netscape Navigator or Communicator, all your Bookmarks are contained in a file called Bookmark.htm. That file's location varies in different versions of the program, but it is usually somewhere inside C:\Program Files\Netscape. Simply copy that Bookmark.htm file over the one the Netscape installation program put onto your new computer.

MAKING .WAVS



I'VE CREATED A Web site for my family in Microsoft FrontPage, and I'd like to add background music to the home page. My wife's cousin has published some piano music on a CD. How do I create a .wav file from this audio CD?

Bret Romfo, Alpharetta, Georgia ▶

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FIGURE 1: STORE-BUILT CLONES and brand-name systems each have their advantages. If you're technically savvy, consider a locally built PC. Otherwise, stick with the brand name.

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INTERNET

DON'T MISS ADDITIONAL HERE'S HOW information at www.pcworld.com/hereshow.

YOU CAN CREATE A .wav file in Sound Recorder, a program that comes bundled with Windows 95. But copyright laws do apply here, and a Web page is an awfully public place for illegal copying. Better check with your wife's cousin about this issue up front.

Put the CD in the drive and select *Start•Programs•Accessories•Multimedia•Sound Recorder.* Once the program is up, start playing the CD. If you're playing a CD in your computer, Recorder will record it. The buttons are pretty easy to figure out (see **FIGURE 2** if you need help here).

If you're not satisfied with the resulting sound, adjust it. Select *Start•Settings•Control Panel,* and double-click the *Multimedia* option. The *Audio* tab contains options for setting the recording volume and the digital quality. But remember: The better the sound, the bigger the .wav file.

You might also want to do some fiddling around with the Volume Control balance settings. Select *Start•Programs•Accessories•Multimedia•Volume Control.* To adjust these settings for recording rather than for playback, select *Options•Properties.* In the Properties dialog box, click *Recording,* then click *OK.*

If you're still not satisfied, download Cool Edit 96, a powerful shareware sound editor/recorder that lets you filter sounds, add echo, and generally get the sound to your liking. Check it out at www.syntrillium.com or on PC World Online.

FIGURE 2: RECORDING MUSIC off a CD is easy in Windows' Recorder. Just push the right buttons.

Use your Web page editor to add the music to your page, or enter the code by hand: Bring up your page in Notepad or any other text editor. Somewhere between the labels '<head>' and '</head>', enter **<bgsound src="*filename.wav*" loop="*n*">**, where *filename.wav* is the name of your sound file and *n* is the number of times you want the clip to repeat itself (**loop="infinite"** will keep the sound going until your guest cries for mercy).

•Cool Edit 96 registration fee for full version $50, for lite version $25; SyntrilliumSoftware; 888/941-7100; www.syntrillium.com

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Empty trash from any window ◆ Store fonts in one place ◆ Solve printing problems

Keep Your System Running Like New

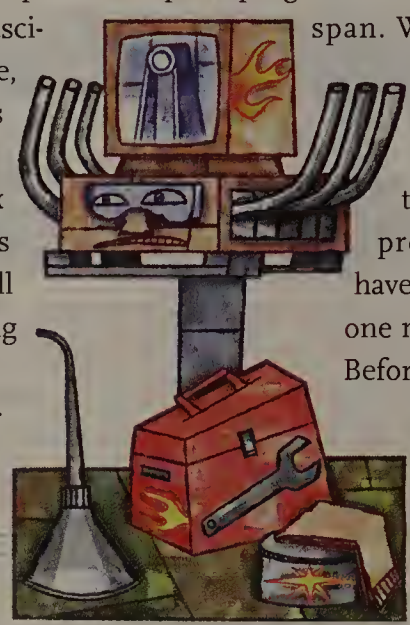
HOW QUICKLY computers age. You just bought a new PC with basic software and some version of Windows installed, and you want it to stay young and beautiful. What should you do? Here are some handy hints.

Be stingy with software. The foolproof way to keep a computer healthy is simple: Never add new hardware or software. But in the real world, change is inevitable, and the computer industry has proved adept at exploiting customers' fascination with upgrades. Here, then, are my golden rules on software upgrades:

1. If it ain't broke, don't fix it. Although Quicken 6 is now in the stores, I'm still using Quicken 2 and loving it. Why change?
2. Don't buy software ending in ".0," which often signals new features that may be inadequately tested or frustratingly buggy.
3. If you do need new software, go for the older version. For example, if 3.0 is the latest thing, see if 2.0c or 2.1 has what you need. These earlier versions are likely to have fewer bugs, and because they were designed for older machines, they typically run much faster.

Watch what you're doing. Before installing new software, take a snapshot of your existing system so you can learn how the installer changed it. Some uninstall programs, like Quarterdeck's Remove-It, include logging utilities for this purpose. Or you can create batch files that track changes for Windows 3.*x* (see *Windows Q&A*, July 1995). Users of Windows 95 and 98 should also back up the Registry.

Back up to basics. Do a complete system backup before making any major change. If you're just installing some small shareware or freeware items, you must first make backups of the most important system files: autoexec.bat, config.sys, win.ini, system.ini, user.dat, user.dao, system.dat, and system.dao.



Take your time. Never install multiple programs or drivers within a short time span. Wait several days between installations to make sure the latest addition works and hasn't messed up anything else. If you install five programs in one day, you'll have trouble determining which one made something go wrong. Before deleting any programs or files in your Windows folders, back them up on floppy disks or in a temporary directory, and keep them for several days or weeks before you delete them.

Get a good driver. Many seemingly unrelated system problems arise from buggy drivers for video, audio, and other hardware. Make sure that you have download access to the latest drivers for your hardware. Don't install new drivers willy-nilly, but do try to obtain the latest drivers if your system acts quirky. As always, keep the old drivers on hand in case you want to revert. The instructions accompanying the new drivers should specify which files are being upgraded.

Be a pest. If you experience problems—from documentation to crashes—let the responsible manufacturer know what needs improving. And thank developers when they do things right.

Bash bloat. I admit it: I run half a dozen doodads invisibly on my system. But the more accessories you have in a StartUp group (Windows 3.*x*) or folder (Windows 95, 98, or NT 4.0), the longer Windows will take to load and the more crotchety your system will be. Likewise, avoid installing billions of unnecessary fonts.

Keep it clean. Keep your hard disk lean and mean by limiting the amount of junk it accumulates. Here are three key rules:

1. Select the *Custom* option in program installers so you can decide what parts of a program to install.
2. Limit the amount of disk space your Web browser uses to cache files.
3. Open the Temp folder in your Windows folder occasionally and delete all files with dates older than the current date (see **FIGURE 1**). Windows or applications may ▶

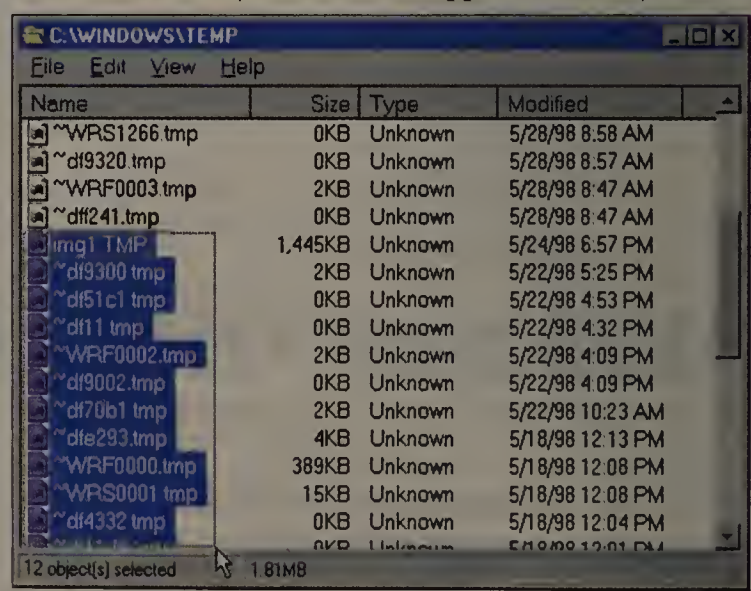


FIGURE 1: UNCLOG YOUR HARD DISK by periodically deleting older files from your Temp folder.

Get the File Details You Want—No More, No Less

WHEN YOU CHOOSE View•Details from the Windows Explorer menu, you'll see several columns of information—file name, size, type, and date last modified. If you don't need all this data, get rid of it. Drag the right side of any column heading to the left until it disappears. Change your mind? Point to the border where the column used to be, and drag to the right. If you want only the file or folder name, choose View•List at the outset.

ILLUSTRATIONS: JEFFREY PELO (TOP), RICHARD DOWNS (BOTTOM)

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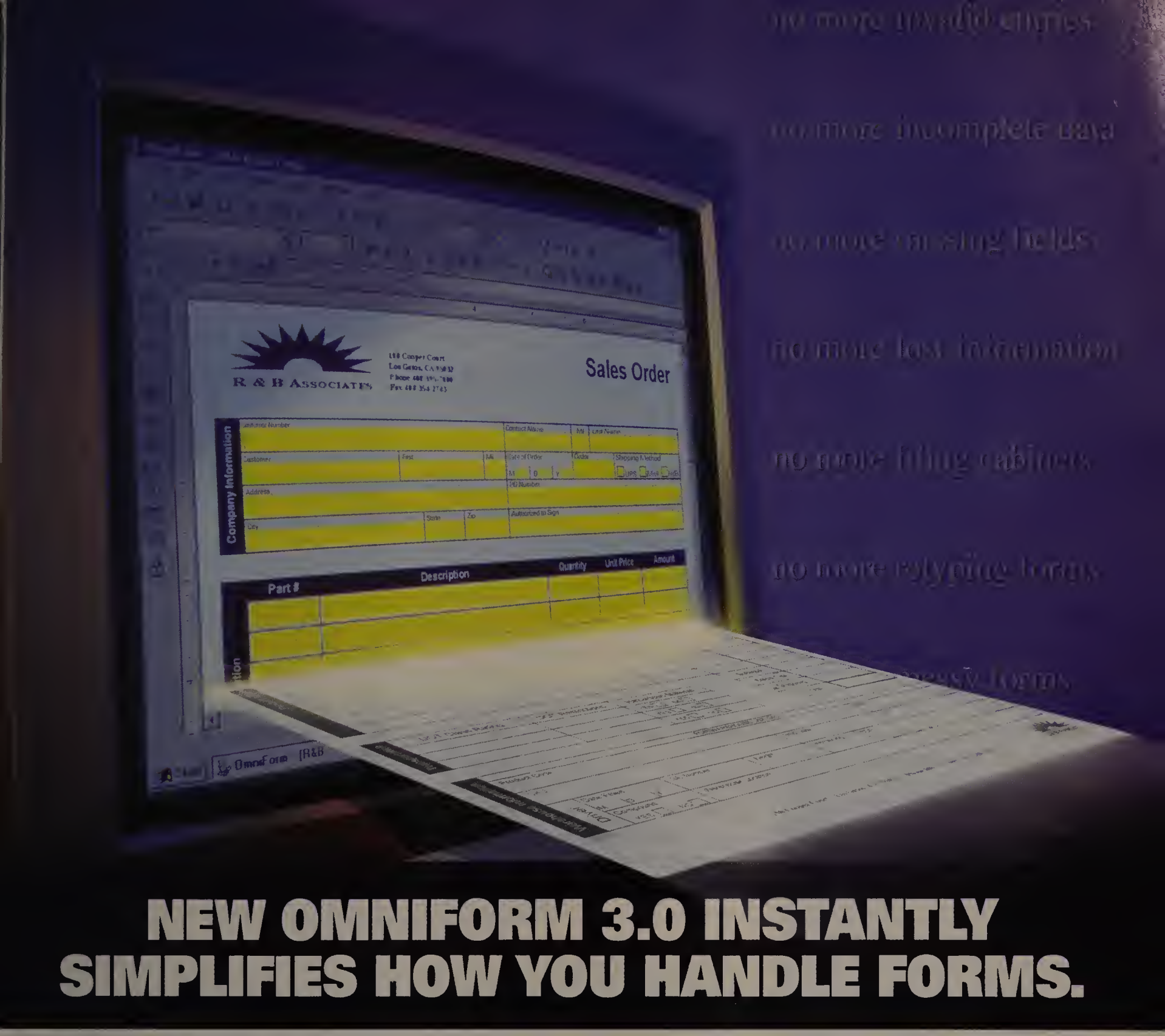

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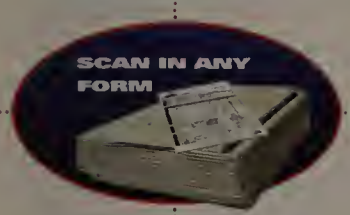

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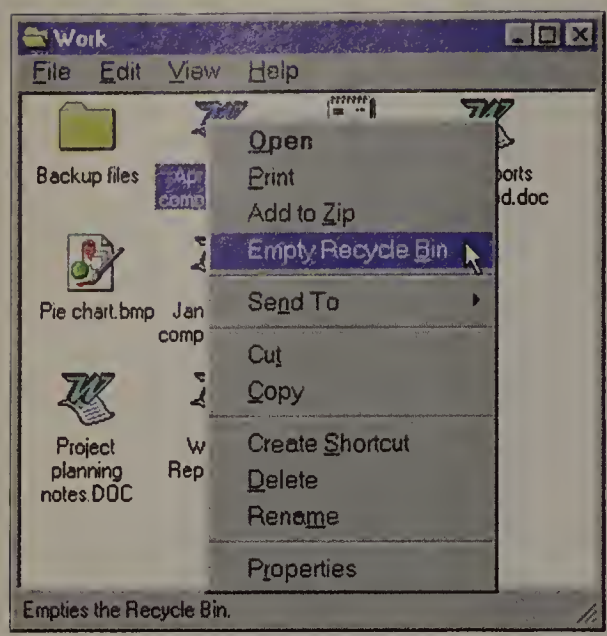

FIGURE 2: A WINDOWS REGISTRY ADDITION lets you take out the trash by right-clicking a file.

still be using files with the current date, so leave those files alone.

Master maintenance. Finally, keep reading *PC World* for troubleshooting tips—for example, see "How to Keep Your PC Trouble-Free" in the October 1997 issue.

• **Remove-It 95** $29.95 list; Quarterdeck Corp.; 800/683-6696; www.qdeck.com

READER SERVICE NO. 674

EMPTY YOUR TRASH ANYWHERE

WHEN YOU'RE rooting around in folders and want to empty the Recycle Bin, it can be a bit of a hassle to move windows out of the way or (in the case of Explorer) to scroll around just to find the Recycle Bin. Wouldn't it be great if you could empty the Recycle Bin from any Explorer or folder window?

If you agree—and you don't mind editing the Windows Registry—then Jason Fisher of Dallas has a solution for you. As a precaution, first back up these Registry files in your Windows folder: user.dat, user.dao, system.dat, and system.dao.

To edit the Registry, choose *Start•Run*, type **regedit**, and press **<Enter>**. Navigate down the tree in the left pane until you reach this location: HKEY_CLASSES_ROOT*\shellex\ContextMenuHandlers. Right-click the ContextMenuHandlers folder on the left, and choose *New•Key*. When the new folder appears, carefully type the following: **{645FF040-5081-101B-9F08-00AA002F954E}** and press **<Enter>**. Exit the Registry Editor.

That's all there is to it. Now, when you right-click any file, you'll have the option to empty the Recycle Bin (see **FIGURE 2**).

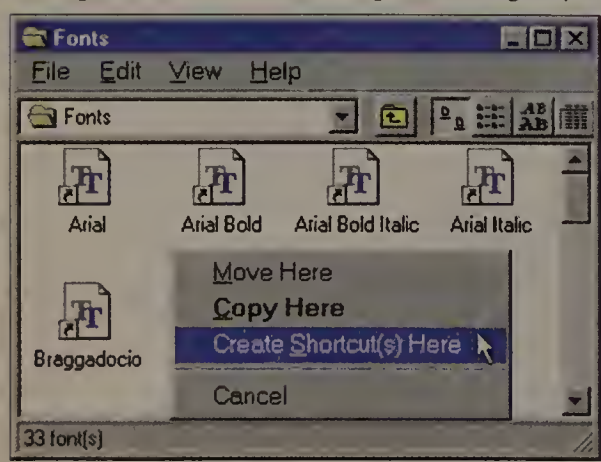

FIGURE 3: DRAG FONTS to a new folder, then back to the original Fonts folder to create Shortcuts.

PUT TRUETYPE IN ITS PLACE

INSTALLING AND removing TrueType fonts is easy in Windows 95. You just drag font files in and out of the Fonts folder.

But if you dual-boot between Windows 95 and Windows 3.*x* or NT, maintaining duplicate font files for each operating system wastes disk space. Keeping all the fonts in one place is far more efficient.

Fortunately, you can.

First, decide where you want to keep all your font files; create a new folder if necessary. Then, in Windows 95 or NT 4.0, open the Windows\Fonts folder and select the fonts you want to move. Use the right mouse button to drag the fonts to the new location, and choose *Move Here* from the pop-up menu. (If your fonts are already where you want them—such as in their previous location in another version of Windows—skip these steps.)

Select the fonts in your new folder, and use the right mouse button to drag them back to the Fonts folder—but select *Create Shortcut(s) Here* (**FIGURE 3**). The Shortcut arrow on each icon in the Fonts folder tells you that the originals are elsewhere.

Some surprises remain: If you view the Fonts folder in Details view, you'll see the file size of the original font (not a small size, as you would expect for a Shortcut). If you right-click and choose *Properties*, you get information about the font itself, not about some Shortcut file. And if you list the contents of the Fonts folder in a DOS window, you'll see no Shortcuts and fewer files than you'd expect. That's because Windows has merely updated the location of the fonts in the Registry; what you see in the Fonts folder is hocus-pocus to let you know what fonts are installed.

PRINTS AND MISSES

IT HAPPENS TO everybody: You choose File•Print, click a few buttons, and wait an eternity before realizing you have a printing problem. Here are a few general guidelines to ▶

Make DOS Windows Do Your Bidding

I LIKE TO RUN all my DOS programs in full-screen mode, but I get tired of having to set Properties every time I install a new program. Is there a way to set the default to full-screen mode rather than 'windows' mode?

David Moroder, Internet

IN WINDOWS 3.*x*, 95, and NT 4.0, the properties for your DOS application (window properties, memory usage, and so on) depend on program information files (PIFs). If a DOS application doesn't have an associated PIF, it uses the properties set in a file named _default.pif. Change this file, and you change the settings for all DOS programs that lack their own PIFs.

To do this in Windows 3.*x*, start the PIF Editor in the Main program group. Choose *File•Open*, select *_default.pif* in the Windows directory, and click *OK*. Then change the settings you want. Don't be surprised if you see a file named _default.bat in the Program Filename box. Though no such file exists on your hard disk, Windows uses this dummy variable as a placeholder, since the PIF cannot be saved if the command line is empty. This is also true for NT.

In Windows 95 and NT 4.0, open _default.pif by right-clicking it (look in the Windows folder) and choosing *Properties*. Then you can modify the settings. For example, click the *Program* tab and check *Close on Exit*, or click the *Screen* tab and select *Full-screen*. Then click *OK*.

If you didn't upgrade to Win 95 from a previous version, your computer may not have a default.pif file. No problem. Just locate the dosprmpt.pif file in your Windows folder, use the right mouse button to drag it to an empty area of the window, and choose *Copy Here*. With the new copy selected, press **<F2>** to rename it, type **_default**, and press **<Enter>**. Then follow the steps above to modify this file.

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help you solve this common problem.

Print from another program. If a Windows application won't print, try printing from another. If only one program won't print, consult its documentation, reinstall the application, or contact the manufacturer.

Print from DOS. If you can't print from any Windows program, exit Windows; then, at the DOS prompt, type **dir > lpt1** (or the name of your printer port). If you're working with a laser printer, you may need to add a step to eject the paper from the printer: Type **echo** followed by a space, and press **<Ctrl>-L**. (The keystroke combination looks like '^L' on screen, but it's *not* the same as typing a caret and a capital *L*.) Type another space and then **> lpt1** (again, your printer port may differ). Press **<Enter>**. If this test doesn't produce a printed directory listing, the problem is not a Windows problem per se. Check all power cables and the cable connecting your PC to your printer. If they're all in working order, the problem may be a faulty port. Connect to another printer port, and repeat this test.

Don't print directly to port. If you find that you can print from the DOS prompt but not from Windows, restart Windows and launch Control Panel. Double-click the *Printers* icon and then click *Connect*. Uncheck *Fast Printing Direct to Port* (as in **FIGURE 4**). This option normally speeds up printing by sending data directly to the printer port without routing it through the normal DOS interrupts. Thus, unchecking this option can slow down printing—but it may solve your printing problem.

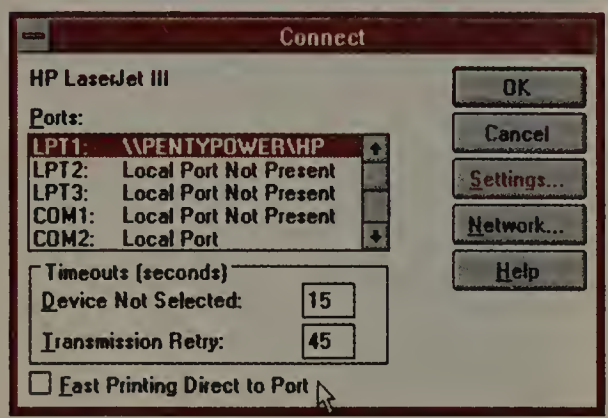


FIGURE 4: PRINTING PROBLEMS got you down? Try unchecking Fast Printing Direct to Port.

Hire another driver. If the preceding guidelines don't help, reinstall your printer driver or replace it with an updated version from the manufacturer. One way to test whether a driver is at fault is to try to make the printer work with another driver. The Epson drivers that come with Windows are compatible with most dot matrix printers, and the HP LaserJet driver (included with Windows, too) works with most non-PostScript laser printers. If using a different driver solves the problem, give your printer manufacturer a call or look for an updated driver on the Web.

CUSTOMIZING YOURSELF INTO A CORNER

AS A CUSTOMIZER, Norton File Manager (part of Norton Navigator for Windows 95) is hard to beat. Choose *Options•Customize* and select *Toolbar, Menu, Shortcut Keys,* or *All* to revamp any of these elements. You can even remove your ability to customize—to keep others from messing up your settings.

After choosing the *Menu* or *All* command from the Customize menu, make sure the *Menu* tab is in front and scroll through the menus until you see the Options•Customize menu. Select an item you don't want anyone to customize, click *Delete,* and click *Yes* at the warning.

Repeat the process for other commands you want to remove. Then click *Save* and *Close*. If you've added button equivalents of the commands to your toolbar, you'll also want to remove them. Choose *Options •Customize•Customize Toolbar.* Scroll through the buttons, pick one to remove, and click *Delete.* Repeat this for other buttons, and then click *Save* and *Close.*

But wait—what happens if you change your mind? How can you make subsequent changes to Norton File Manager?

Not to worry. Just press **<Ctrl>-<Alt>-<Shift>-<F10>** to reopen the Customize dialog box. Click a tab for the area you want to change. Select the desired part of the menu or toolbar, select a command from the Commands list, and then click *Insert.* If you want to add a new menu in the menu tab, click the *Add menu* button. To edit the names of menus, double-click a menu name and start typing. To change the <Alt> shortcut key for a menu, type an ampersand (**&**) in front of the desired letter. Or you can return the entire menu (toolbar or shortcut keys, depending on the currently displayed tab) to normal by clicking *Default.* Click *Save* and *Close* when you're done.

Find files from this article on PC World Online at www.fileworld.com. Windows Tips *welcomes your questions and tips and pays $50 for published items. Contributing Editor Scott Dunn is a co-author of* The PC Bible, 2nd Edition *(Peachpit Press, 1995, 800/283-9444). See page 14 for contact information.* ■

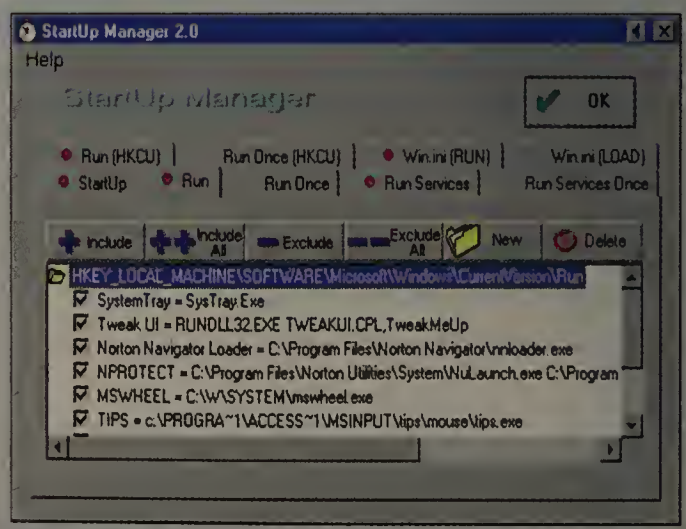
ILLUSTRATION: RICHARD DOWNS

WINDOWS TOOLBOX

Seize Control of Hidden Launches With StartUp Manager

PUTTING SHORTCUTS IN the StartUp folder isn't the only way to make a program run automatically when you start Windows 95 or NT 4.0. Some programs run invisibly, thanks to settings they changed in the Windows Registry. StartUp Manager (freeware available on PC World Online) reveals them all and lets you disable applications temporarily or permanently.

Because StartUp Manager deals with some rather obscure Registry entries, I recommend this utility only for advanced users, though online help is available.



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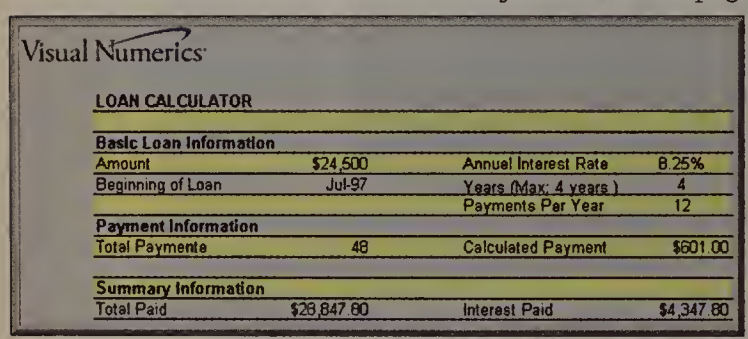
Put Your Spreadsheet on a Company Web Page

I HAVE A simple worksheet that I'd like to display on my company's Web site. Site visitors could enter values into the input cells, and the worksheet's formulas would calculate and display the result (a price estimate). I'm not talking about a fancy order-taking system, just a way to provide spreadsheet interactivity over the Web. Any suggestions?

Robert Awkins, Corona, California



Visual Numerics

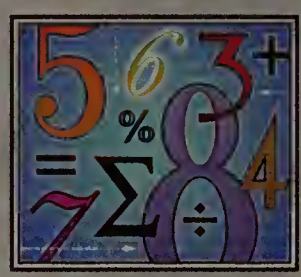
LOAN CALCULATOR			
Basic Loan Information			
Amount	$24,500	Annual Interest Rate	8.25%
Beginning of Loan	Jul-97	Years (Max: 4 years)	4
		Payments Per Year	12
Payment Information			
Total Payments	48	Calculated Payment	$601.00
Summary Information			
Total Paid	$28,847.80	Interest Paid	$4,347.80

FIGURE 1: POST AN INTERACTIVE worksheet on the Web by saving it as a Java applet in Visual Numerics' SmartTable.

WHY NOT SIMPLY make your worksheet available for downloading from the company's Web page or FTP site? Visitors might prefer to use it offline. For maximum compatibility, make the file available in Lotus wk1 format or Excel 4 format.

All other options currently involve some programming or special software tools. If you want a truly interactive online worksheet, you can pursue a number of approaches. The traditional one is to use HTML forms, with text boxes for input. The user enters data and clicks a Submit button. The data goes to the server, where it's processed (usually by a CGI program), and the user receives the results as a new HTML document. Not exactly instant gratification, but it works fairly quickly. You have to do some programming, however.

If all your customers use browsers that support Java (Netscape Navigator version 3, Netscape Communicator, or Internet Explorer 3 or later), you can write JavaScript code to process the user's entries and display the results. Since the calculations occur on the client side, data doesn't have to be sent to and from the server, making this option more efficient than a CGI program.



Several products automate this process to provide slick spreadsheet access in a Web page. Visual Components, for example, offers Formula One (an ActiveX control that works with Internet Explorer) and Formula One/Net (a Navigator plug-in).

For a more general solution, consider the Visual Numerics SmartTable. It converts Excel spreadsheets into Java applets, which work on both Explorer and Navigator (see **FIGURE 1**).

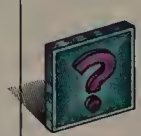
•**Formula One** $199 list, **Formula One/Net** free; Visual Components; 800/771-1645; www.visualcomp.com

READER SERVICE NO. 700

•**SmartTable** $149 list; Visual Numerics; 800/364-8880; www.vni.com

READER SERVICE NO. 701

STOP FILES FROM OPENING AUTOMATICALLY



MY GATEWAY P5-166 has a bug that loads many Excel files whenever I start the program. The PC, which is running Office 97 and Windows 95, is attached to a company NT 4.0 server, but I had the same problem on a Novell network. I've tried everything, including network experts' advice, but the problem remains. Excel loads so many files, it finally runs out of memory.

Tom Powers, Internet

THIS PROBLEM has nothing to do with your PC or your network. When Excel starts, it automatically opens all files in the \xlstart directory. Check \xlstart, and remove any files that shouldn't be there. Excel may also be opening files from an alternate start-up location. Start Excel and choose *Tools•Options*, click the *General* tab, and check the *Alternate start-up file location* field. Delete any directory listed there.

Check Out Spreadsheet Templates

EXCEL, QUATTRO PRO, AND 1-2-3 all come with templates for common spreadsheet tasks such as planning a business and managing a loan. Even if you don't need to use the templates, you can get good formatting ideas from them. In Excel, select *File•New*, click the *Spreadsheet Solutions* tab, and select a file. (Head to www.microsoft.com/officefreestuff/excel/ for more templates.) In Quattro Pro 8, select *File•New* and choose from more than 60 templates. In 1-2-3, select *File•New* and pick a SmartMaster.

A BETTER WAY TO COUNT WORDS

IN DECEMBER 1997, I provided an array formula for counting the words in a cell. Craig Woodard of Franklin, Tennessee, suggests a clever solution that uses the Substitute function instead (see **FIGURE 2**). It works in Excel and Quattro Pro.

In Excel, to count the number of words in cell A1, use this formula:

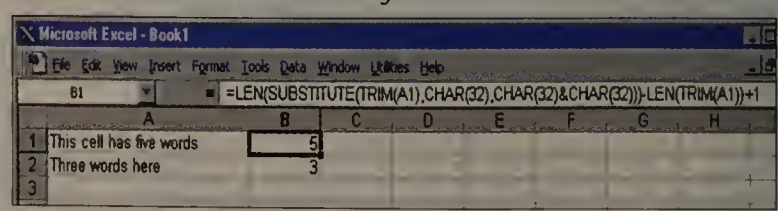
=len(substitute(trim(A1),char(32),char(32)&char(32)))-len(trim(A1))+1

In Quattro Pro, use this formula:

@length(@substitute(@trim(A1),@char(32),@char(32)&@char(32)))-@length(@trim(A1))+1

The formula substitutes two spaces for every space, calculates the string length, then subtracts the length of the original string and adds one.

Spreadsheets welcomes your questions and tips and pays $50 for published items. Contributing Editor John Walkenbach is the author of nearly two dozen spreadsheet books and maintains The Spreadsheet Page (www.j-walk.com/ss). See page 14 for contact information. ■



Microsoft Excel - Book1

File Edit View Insert Format Tools Data Window Utilities Help

B1 =LEN(SUBSTITUTE(TRIM(A1),CHAR(32),CHAR(32)&CHAR(32)))-LEN(TRIM(A1))+1

	A	B
1	This cell has five words	5
2	Three words here	3
3		

FIGURE 2: COUNT THE NUMBER OF WORDS in a worksheet cell by using the Substitute function instead of an array formula.

ILLUSTRATION: JEFFREY PELO

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Add any Word command to a toolbar ◆ Make WordPerfect 8's Tab key behave

Automatically Open the Last Edited Document

IF YOU FREQUENTLY edit the same document or work on one file for several days, you may want Word to load it automatically when the program starts up. Word has no built-in feature for doing this, but a simple recorded macro can handle the job. Here's what to do:

1. In Word 6 and 7, select *Tools•Macro* and then click *Record* in the Macro dialog box. In Word 97, select *Tools•Macro•Record New Macro*. In the Record Macro dialog box, type **autoexec** in the Macro name field and then click *OK*.
2. Select *File* from the menu, click the first entry in the list of recently opened files, then select *Tools•Macro•Stop Recording*.
3. Exit Word to save the macro. The next time you start Word, it will automatically load the last document you worked on.

EMPHASIZE TEXT WITH ARROWS

EVERYTHING IN YOUR document is important, of course, but some passages are especially pithy. To make sure that they get read, point to them with arrows.

To create this:	Type this:
→	-->
⇒	==>
⇔	<=>
←	<--
⇐	<==

In Word 7 and Word 97, you can insert several kinds of arrows into text by typing normal keyboard characters (see the table above for several options). The arrow will appear in the current font size, but you can enlarge it as you would any text.

Note: If this tip doesn't work when you try it, select *Tools•AutoCorrect*, click the *AutoCorrect* tab, select *Replace text as you type*, and then click *OK*.

SAVE TIME AND SPACE BY TOGGLING THE FAST SAVE OPTION

THE FAST SAVE OPTION in Word 7 and 97—which saves only the changes you make in a document, rather than the entire document itself—is on by default. This speeds up automatic timed saves, but each time the file is saved it increases in size, since it retains all deletions and formatting changes. When used with frequently edited documents, fast saves can waste an enormous amount of disk space.

Here's how to have your cake and eat it too: Keep the Fast Save feature on while you're working on a document, to speed up automatic saves. Then, before you close the document, disable Fast Save and then save the file to remove extraneous information. Turn the feature back on to speed up saves on other documents.

Unfortunately, it's easy to forget the second step. If this approach is too much bother, you can disable the feature permanently, though you'll notice that automatic timed saves take somewhat longer.

In either case, enabling or disabling Fast Save is easy. Select *Tools•Options*, click the *Save* tab in the Options dialog box, click *Allow fast saves* to change the current setting, and then click *OK*.

GET HELP WITH DIALOG BOXES

DIALOG BOXES in today's word processors tend to be loaded with options, many of which you may not understand. Fortunately, there's an easy way to get help.

In Word 95 and 97, and in WordPerfect 7 and 8, click the question mark button at the top of the dialog box; then click the option you don't understand. A box will pop up with a description of that item's function (see the figure at right). In Word 95, you can also right-click any feature for an explanation. In Word 97, right-click the feature and then click *What's This?*

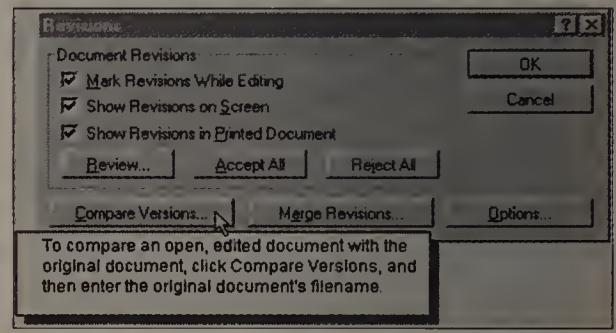
Add Boldface and Italics From the Keyboard

WORD 97 lets you format text as you type. To create boldfacing, type an asterisk (*) at the beginning and end of the text you want in boldface, either as you type or during editing. To italicize text, type an underscore (_) at the beginning and end of the desired text.

Before you try this, select *Tools•AutoCorrect*, click the *Autoformat As You Type* tab, and make sure the **Bold* and _Underline_ with real formatting* box is checked.

CREATE TOOLBAR BUTTONS FOR ANY WORD COMMAND

WORD'S TOOLBARS ARE FINE for most of us, but what if you frequently use a command that isn't on any toolbar? If you type long documents with footnotes, say, you might want the ViewFootnotes command on the Standard toolbar so you can edit them easily. Or maybe you'd like a button that lets you quickly change text color. These commands are easy to add to any toolbar. Just follow the steps outlined here and illustrated in Step by Step.



CLICK THE QUESTION MARK at the top of the dialog box, then click the option you don't understand.

1. To show the toolbar that will hold the new button, right-click any toolbar and then select it from the pop-up menu.
2. In Word 6 and 7, select *Tools•Customize* and click the *Toolbars* tab; in Word 97, select *Tools•Customize* and click *Commands*. Then choose *All Commands* from the Categories list in the Customize dialog box.
3. Scroll down the Commands list until you find the command you want to add to a toolbar. In Word 6 and 7, click the ▶

ILLUSTRATION: JEFFREY PELO

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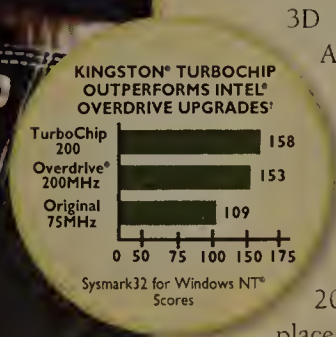

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Circle 133 on reader service card

command to view a description of its action in the Description box. In Word 97, click the command, then click *Description*.

4. Drag and drop the selected command on the toolbar. In Word 97, any command displaying an icon in the Commands list will show that icon on the toolbar. All other commands will appear as text buttons. In Word 6 and 7, the Custom Button dialog box will prompt you to select an icon.

BUTTONING AND UNBUTTONING IN WORD

WHILE YOU'VE GOT WORD'S Customize dialog box open and have the Toolbars or Commands tab selected, try these additional tips for making the toolbars more useful.

Remove a button by dragging it off the toolbar and onto the document.

Drag buttons onto the menu bar in Word 97. This makes them available at all times, whether toolbars are displayed or not, and maximizes your screen space.

Change the appearance of a button by right-clicking it and then selecting *Edit Button Image* from the pop-up menu.

Rearrange buttons by dragging them to difference positions or to another toolbar.

TAME WORDPERFECT'S TAB KEY

AS INSTALLED, WordPerfect 8 behaves oddly if you press the **<Tab>** key at the beginning of any but the first line of text in a paragraph. Instead of moving the text on that line to the next tab stop, WordPerfect indents the remainder of the paragraph to the next tab stop.

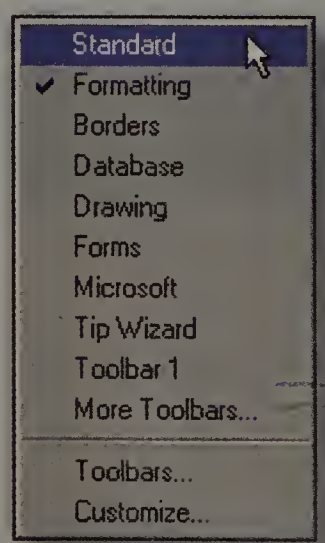
To make WordPerfect behave more normally when you press the **<Tab>** key, select *Tools•QuickCorrect* and click the *Format-As-You-Go* tab in the QuickCorrect dialog box. Uncheck *QuickIndent* in the *Format-As-You-Go choices* box, then click *OK*.

Word Processing Tips *welcomes your questions and tips and pays $50 for published items. Contributing Editor George Campbell is a contributor to* The PC Bible *(Peachpit Press, 1995, 800/283-9444). See page 14 for contact information.* ■

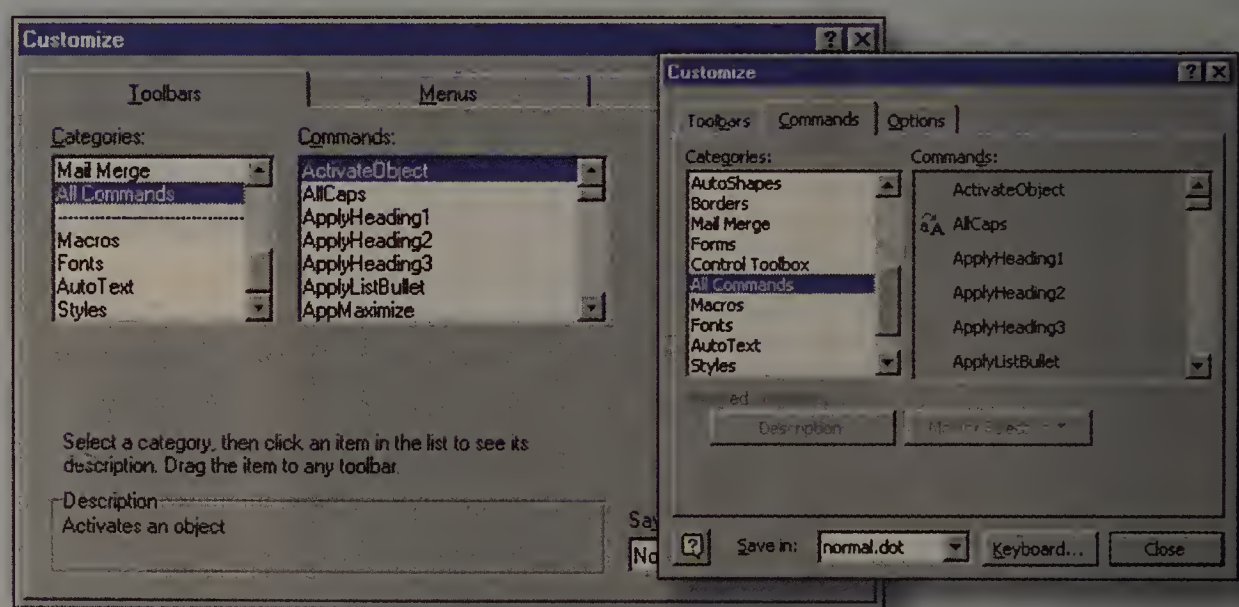
STEP BY STEP

Add Any Frequently Used Word Command to a Toolbar

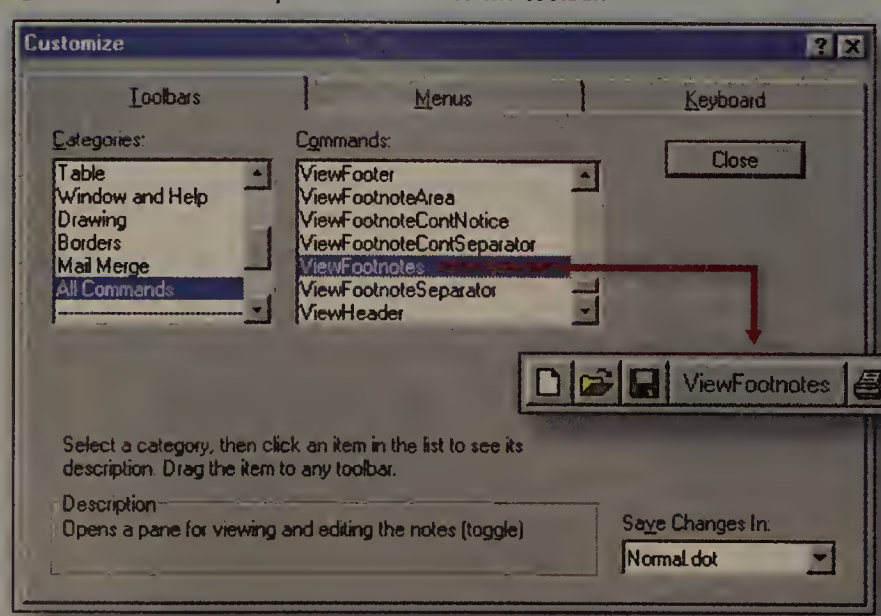
❶ **Display the toolbar that you want to contain the new button.**



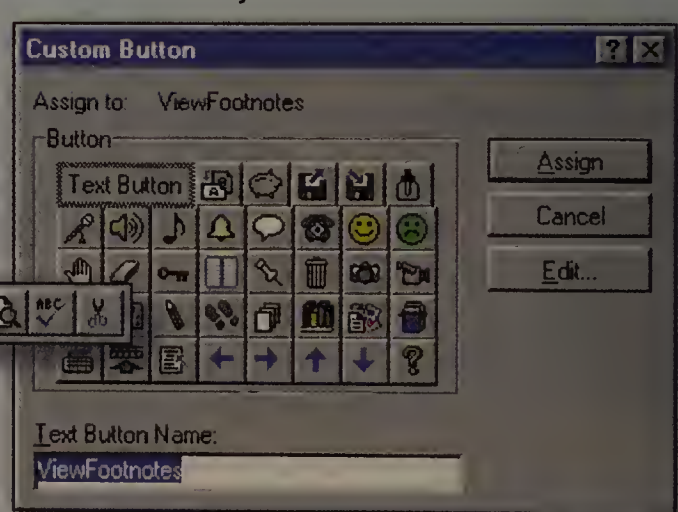
❷ **Select *Tools•Customize* and click the *Toolbars* tab (in Word 6 and 7, shown below left) or the *Commands* tab (in Word 97, below right). Then select *All Commands*.**



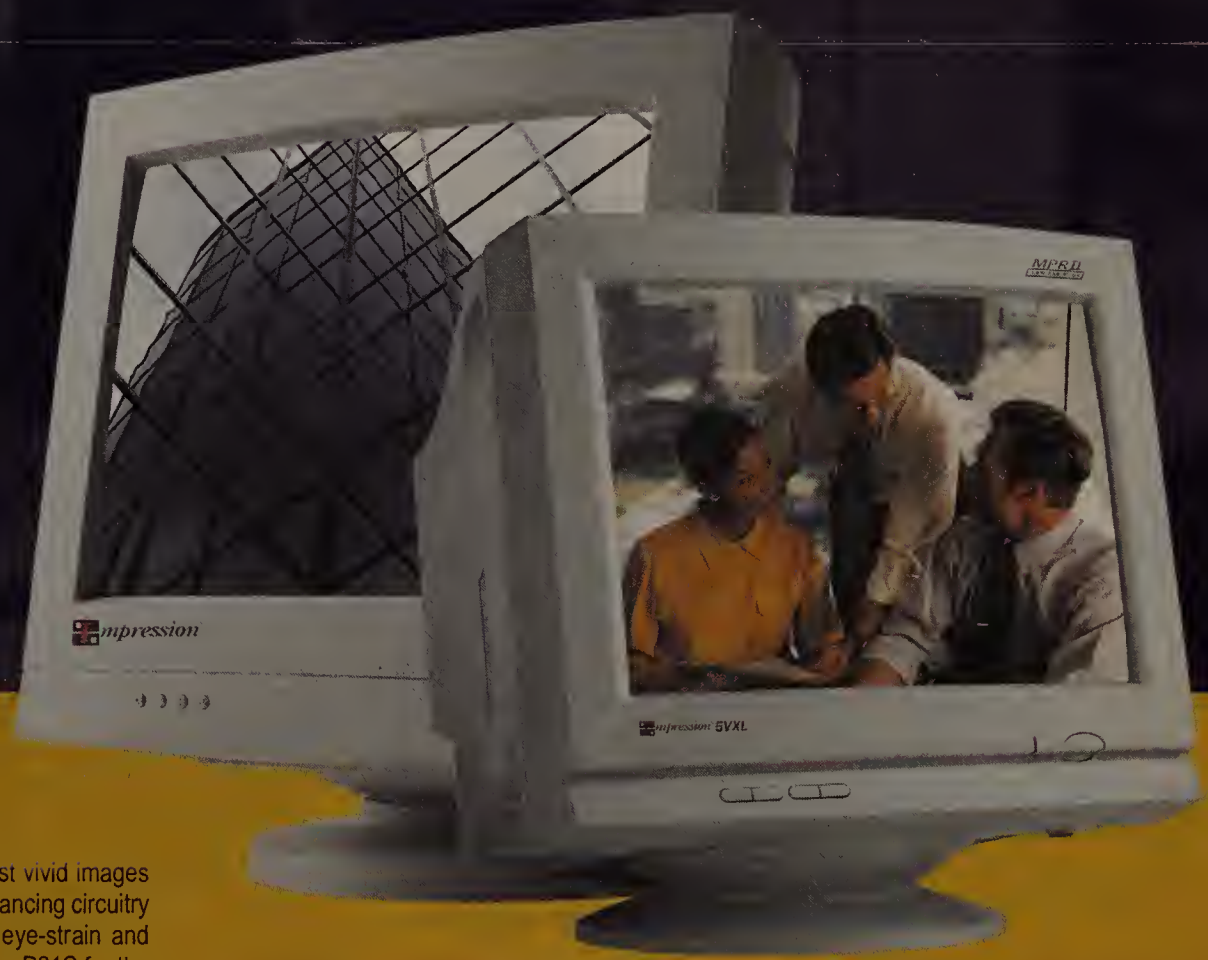
❸ **Select the command you want to add to the toolbar.**



❹ **Drag and drop the command onto the toolbar. In Word 6 and 7, select an icon or the *Text Button* option from the Custom Button dialog box.**



Clearly,
It's your best business decision.



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MODEL	VIENNA P21S	VIENNA PRO 17	7VX	7VXL	5VX	4 P[illegible]
CRT	HI-CONTRAST	DIAMONDTRON	HI-CONTRAST	MICROFILTER	S-MASK	S-MASK
PITCH (MM)	0.28	0.25 A.G.	0.26	0.26	0.28	0.28
VIEWABLE AREA	19.9"	16.1"	15.8"	16.0"	13.8"	13.2"
H-SCAN (KHZ)	30-117	24-82	30-95	30-70	30-70	20-57
MAX. RESOLUTION	1600X1200	1600X1200	1600X1200	1280X1024	1280X1024	1024X768
OPTIMUM RESOLUTION	1600X1200 @ 93 Hz	1280X1024 @ 75 Hz	1280X1024 @ 91 Hz	1024X768 @ 85Hz	1024X768 @ 75 Hz	800X600 @ 85 Hz
MSRP*	$1149	$549	$499	$439	$219	$179

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Circle 7 on reader service card

Find a job or post an opening on the Web ◆ Make sure your IP address is correct

Indispensable Plug-Ins Enhance Your Browser

THE PRESS CONFERENCE about the latest scandal to rock Washington will be broadcast live on CNN.com at 10 a.m. EST. So you log on to CNN's Web page at 9:59. Arrrrghhh! You can't view the broadcast until you've downloaded a plug-in.

Next time, don't miss the party. Download the most essential plug-ins now.

Plug-ins are programs that play or display files that your browser might encounter on the Web and would otherwise not know how to handle, such as sound or movie clips. Most popular plug-ins work with both Netscape Communicator and Internet Explorer, and some come preinstalled in your browser. If you're using Netscape Navigator or Communicator, you can see which plug-ins are already installed by selecting *Help•About Plug-ins.*

Microsoft developed an alternative set of plug-ins based on Windows' ActiveX technology. But ActiveX applets (called *controls*) have yet to gain huge popularity on the Web, largely because they don't work smoothly with Communicator.

For plug-ins to work in Internet Explorer, the browser must be set to run both ActiveX controls and plug-ins: Select *View•Internet Options* and click the *Security* tab. Select *Internet zone* and click the *Custom* button, then the *Settings* button. Make sure that *Run ActiveX controls and plugins* is enabled.

Here's a guide to indispensable plug-ins. All are free and available on PC World Online as well as from the vendor. Typically they come as executable files, which you install as you would any other Windows package. Be forewarned that some files are very large (the Acrobat Reader, for example, is 5MB).

Adobe Acrobat Reader: This free viewer from Adobe Systems (www.adobe.com) lets you view and print documents stored in Adobe's Portable Document Format, a spiffy desktop publishing format that's become standard on the Web. The *Los Angeles Times* (www.latimes.com) publishes its Washington Edition as a PDF file (see **FIGURE 1**). The Texas Association of Realtors (www.texasrealestate.com) uses PDF to let home sellers fill out listings on the Net.

FIGURE 1: DOWNLOAD THE ADOBE ACROBAT READER to read the Washington Edition of the Los Angeles Times.

Cosmo Player: This VRML (Virtual Reality Markup Language) viewer from Silicon Graphics (www.cosmo.sgi.com) flies you through virtual spaces to play 3D games and view heavily animated Web sites. The Dilbert Zone (umweb1.unitedmedia.com/comics/dilbert/vrml) makes effective use of VRML (which the site calls Very Ridiculous Marketing Lingo).

QuickTime Viewer: Most movies on the Web are stored in Apple's QuickTime video format. In order to see them, you need Apple's QuickTime viewer (www.quicktime.apple.com).

RealPlayer: Enjoy video, sound, and animation with this multitalented multimedia player from RealNetworks (www.realaudio.com).

Shockwave Player: With Macromedia's Shockwave (www.macromedia.com), you can view product demonstrations (www.kodak.com:80/shocked.shtml) or participate in interactive games (slugfest.kaizen.net). Macromedia's page has links to thousands of "shocked" sites.

WARNING: DON'T TWEAK THOSE PLUG-IN SETUP MENUS!

A CERTAIN *PC World* columnist, who shall remain nameless, was poking around the Web one night and discovered that all her browsers refused to download .exe files. Suspecting that the problem lay with erroneous file attributes—possibly set by a shareware utility she'd been testing—she headed to the applications setup menu in Netscape Communicator 4.0 (*Edit•Preferences•Navigator•Applications*).

In earlier versions of Netscape Navigator, and in other browsers, the helper applications setup menu was a fairly innocuous place where users could configure plug-ins and in general tell the browser how to respond to certain file types it might encounter—downloading them, say, or loading a particular plug-in to run them. In Communicator 4.0, however, this menu is more intimately tied to the Windows Registry, making it a dangerous place to venture into. (Internet ▶

Is AOL Watching You?

A FIRED America Online employee alleges a diabolical scheme in which AOL technicians plant cookies on subscribers' hard drives so they can gather personal data while a subscriber is logged on. Sound far-fetched? The e-mail chain letter with this story is forwarded regularly to *PC World* offices by alarmed readers. "It's utterly untrue," says Tom Ziemba, a spokesperson for AOL. "We take our members' privacy very seriously." Prodigy has been the target of a similar rumor that started about nine years ago.

ILLUSTRATION: JEFFREY PELO

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Explorer 4.0, by the way, does not offer any such menu—a wise design choice.)

The *PC World* columnist naively typed directions for Netscape to download any .exe files it encountered. Netscape—or whatever evil force lay behind it—overwrote the .exe file attributes stored in the Registry. Consequently, whenever she tried to load any program other than Netscape, Windows fired up Netscape and headed out onto the Web. In other words, Windows no longer knew what to do with .exe files. To make matters worse, Windows refused to let her edit the .exe file attributes in its File Types menu, or even to delete or alter the settings in Netscape.

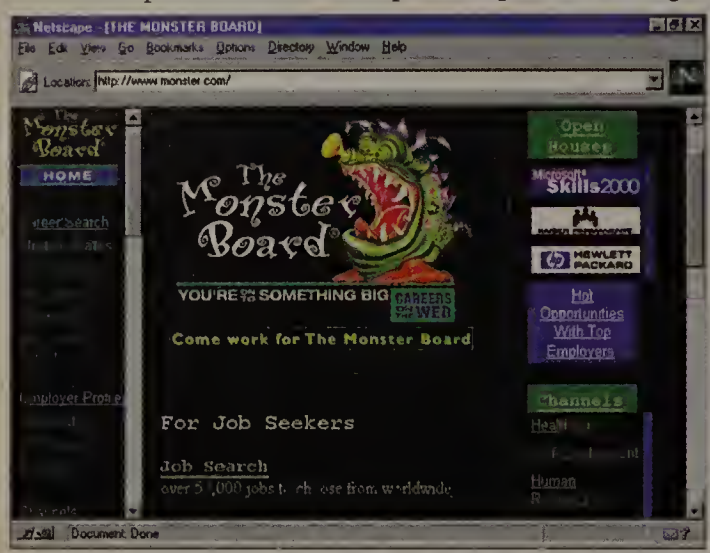


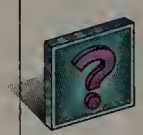
FIGURE 2: VIEW JOB LISTINGS, scan newsgroups for job postings, and post your résumé on The Monster Board.

Growing increasingly frantic, especially upon discovering that her backup of the Windows Registry was bad, the columnist decided to edit the Registry herself. But Windows refused to load the Registry editor, so she renamed it 'netscape.exe'. The situation went from bad to worse as Windows refused to permit her to edit .exe file attribute keys in its Registry. Windows could not be reinstalled because it did not know what to do with setup.exe, and the system could not be restored from tape backup because Windows would not run the tape backup software—even after it, too, was renamed 'netscape.exe'. After a long night of menu thrashing and fretting, I—er, I mean our columnist—called Microsoft tech support.

"That is the most bizarre story I have ever heard," grumped a sleepy tech support guy in Seattle, where it was 4 a.m. Order was restored after he dictated several dozen lines of code for the columnist to type into the Registry.

Moral of the story: Steer clear of Communicator 4.0's applications setup menu. If you must tweak browser plug-in configurations, there or in Windows' File Types menu, make sure you back up the Windows Registry before you start: Copy system.dat, system.dao, user.dat, and user.dao to another folder. And never, ever enter file attributes for .exe files—anywhere.

FIND A JOB OR AN EMPLOYEE ON THE INTERNET



IS THERE A WAY to post job openings at my company to hundreds of places on the Web by sending out a single e-mail message?

Bob Moore, Woodland Hills, California

IF THERE IS, I can't find it. That's probably because most Web job-posting sites, with the exception of classifieds on services like Yahoo (www.yahoo.com), charge employers fees to post openings. The Internet is definitely a more welcoming place to people looking for work than to would-be employers (see **FIGURE 2**). The table "Web Sites Connect Job Seekers with Employers" presents some popular Web-based job-listing sites, with their fees and services for employers and job hunters.

CHECK FOR CHANGED IP ADDRESSES

C. C. CHU OF Ithaca, New York, writes that he was unable to access his online brokerage's Web site from his work PC. Whenever his browser tried to access the site, it timed out. But Chu could access the site from his home PC a few miles away. Both systems were configured similarly, and both were running Netscape Communicator 4.02, but it turns out that his work PC's IP address (the unique address that identifies a computer on the Internet, such as 208.208.208.1) had changed. The Web sites in effect were unable to report back to his PC because they couldn't find it. After updating the IP address in his Dial-Up Networking setup, Chu had no further problems.

online *Find files from this article at www.fileworld.com.* Internet Tips *welcomes questions and tips and pays $50 for published items. Contributing Editor Judy Heim is a coauthor of* The Quilter's Computer Companion *(No Starch Press, 1997, 800/420-7240). See page 14 for contact information.* ■

WEB SITES CONNECT JOB SEEKERS WITH EMPLOYERS

WEB SITES	What job seekers can do...	What employers can do...
America's Job Bank www.ajb.dni.us	Search thousands of employment service job listings by occupation and state (free).	Post job openings (free, but you must register your business first).
CareerMosaic www.careermosaic.com	Search job listings (mostly in high-tech fields), post your résumé, search Usenet job-posting newsgroups (free).	Post job openings ($150 for 30 days).
CareerPath.Com www.careerpath.com	Search job listings from about 50 major U.S. newspapers, post your résumé (free).	Post job openings, search résumé database (fees vary).
Hot Jobs www.hotjobs.com	Search job listings (mostly in high-tech fields), post your résumé (free).	Post job openings, search résumé database (membership fee $500 per month).
JobDirect.Com www.jobdirect.com	Search job listings for entry-level jobs (free).	Search résumé database (fees vary).
The Monster Board www.monster.com	Search job listings, search Usenet job-posting newsgroups, post your résumé, get relocation information (free).	Post job openings ($175 for 60 days), search résumé database for three months ($1900) or for a year ($4900).

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Using Fdisk and Format utilities ◆ What's to blame for spots before your eyes

Repartitioning Your Drive Saves Space and Trouble

UNLESS YOU RECENTLY bought a PC running the latest version of Windows 95, your hard disk space is probably not organized as well as it could be. The reason? Most hard disks come set up with a single partition, which wastes a lot of space under earlier versions of Windows.

Basically, a partition is just a section of a hard disk; a single partition covering the whole drive is usually known as the familiar C:. You can divide a drive into multiple partitions of any size, each with its own drive letter.

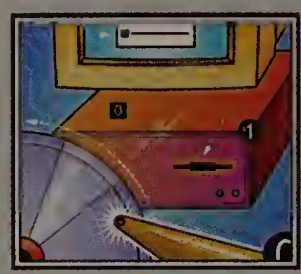
Repartitioning can provide better organization and easier backups. Storing data on its own partition away from applications means you can easily drag and drop a drive icon onto your backup device's icon. If you're using a 100MB Zip drive for backups, for example, storing your files in convenient 100MB partitions can save you from tedious sorting.

But what's really cool is that repartitioning lets you squeeze more space out of your hard disk—maybe *lots* of space.

CLUSTER FLUSTER

YOU GET THIS ADDED space because of the way data is stored on the disk, in fixed-size chunks called *clusters*. On DOS, Windows 3.*x*, and many Windows 95 systems, clusters range in size from 2KB to 32KB depending on the size of the partition (see **FIGURE 1**). The smaller the cluster, the more efficient your disk, since each file on the disk must use at least one cluster, and any unused space in the cluster is lost.

If you cram your disk with zillions of small files, this wastage adds up. Say you've got 500 e-mail messages, each stored in its own small text file on a 1.2GB, single-partition FAT16 disk. That probably translates to around 8MB of wasted space. By comparison, if the files were stored in a 100MB partition—which uses 2KB clusters—the lost space would probably be around 500KB.



To check a disk's cluster size, run ScanDisk: Select *Start•Programs•Accessories•System Tools•ScanDisk*, select the drive, and click *Start*. The third line from the bottom of the Results box shows the number of bytes in a cluster (also known as an *allocation unit*).

If you're running DOS, Windows 3.*x*, the original Windows 95, or Windows 95 upgraded with Microsoft's Service Pack 1 (version 4.00.950A), you must divide your disk into smaller partitions to get smaller clusters.

But if you're lucky enough to be running the new, upgraded version of Windows 95, version 4.00.950B, you have another choice. (Check your version by right-clicking *My Computer*, selecting *Properties*, and then looking under the General tab.)

Version 4.00.950B, also called OSR2, supports FAT32, an improvement on the original FAT16 file system that DOS and older versions of Windows 95 use to keep track of the location of files on your hard disk. FAT32 offers several improvements, including a maximum partition size of 2 terabytes—up from FAT16's 2GB limit—and much smaller clusters on large partitions—only 4KB on partitions up to 8GB (see Figure 1).

Note that FAT32 is available only on new PCs sold in the last year and a half (and on the soon-to-be-released Windows 98). And not all of these PCs come with FAT32 enabled.

Whether you're trying to reduce your disk's cluster size with FAT32 or with smaller partitions, here's what to do. ▶

Quick Fix for Video Problems

ONE COMMON CAUSE of some maladies (ranging from odd-looking shapes and colors on screen to an unreliable mouse to spontaneous rebooting) is a bad video driver. Troubleshoot for this by replacing your current driver with Windows 95's generic VGA driver. Select *Start•Settings•Control Panel•Display•Settings•Change Display Type*. Under Adapter Type, select *Change•Show all devices*, and from the Manufacturers list, select *(Standard display types)*. You may have to reboot. If the problem disappears, you've found the culprit.

SAVE PRECIOUS SPACE WITH FAT32

Cluster size	Approximate capacity wasted by 500 files	FAT32 partition size	FAT16 partition size
512 bytes	very small	less than 260MB	not applicable
2KB	500KB	not applicable	16MB-127MB
4KB	1MB	260MB-8GB	128MB-255MB
8KB	2MB	8GB-16GB	256MB-511MB
16KB	4MB	16GB-32GB	512MB-1023MB
32KB	8MB	32GB-2048GB	1024MB-2048MB

FIGURE 1: DISKS WITH THE FAT16 FILE STRUCTURE fritter away space—unless you keep your partitions small. The upgraded FAT32 file structure means big savings for big drives.

ILLUSTRATIONS: JEFFREY PELO (TOP), RICHARD DOWNS (BOTTOM)

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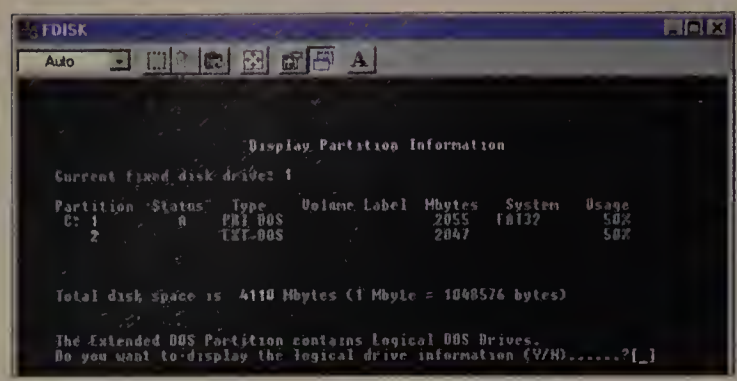

FIGURE 2: CHECK YOUR CURRENT partition status with Fdisk. Here, multiple partitions have been established.

PARTITIONING THE HARD WAY

DOS AND WINDOWS 95 come with two key utilities: Fdisk, which deletes and creates partitions, and Format, which sets up the file system. Both run in DOS mode and can be found on Win 95's start-up disk.

But using Fdisk and Format on a hard disk with data already on it is no walk in the park. Fdisk makes you delete existing partitions before you can create new ones. And that means losing all your data. So you'll have to back up everything you want to keep to a separate disk or tape, and then copy it back to a newly repartitioned disk.

Use Fdisk to decide on your repartitioning strategy before deleting partitions. First, insert your start-up disk in drive A: and reboot. From the command line, run **fdisk**. To learn about partitions and see how your drive is partitioned now and what each partition's drive letter assignment is, select choice 4 on Fdisk's menu. A sample result (for a drive that does have multiple partitions) is shown in **FIGURE 2**.

There are three types of partitions (see **FIGURE 3**), which must be created in the following order:

FIGURE 3: DIVIDE YOUR HARD DISK into a primary partition (which must hold the operating system) and an extended partition (which can hold one or more logical drives).

Primary partition. A primary partition must hold a bootable operating system. If you want your computer to be able to boot from more than one operating system, you must create a separate primary partition for each one. DOS and Windows 95 allow up to four primary partitions on a single disk. But Fdisk can set only one as the "active" or bootable partition.

Extended partition. Once you've created a primary partition, you can create additional partitions in the remaining space on the disk. First you must define the unused space as an extended partition. Then you divide that extended partition into logical drives.

Logical drives. Each logical drive has its own drive letter. Typically, a logical drive stores applications and/or data.

When you're ready, you can select Fdisk's choice 3 to delete existing partitions (delete all the logical drives on the extended partition first, then the extended partition itself, then the primary partition). Then reboot, and use Fdisk's choice 1 to create new partitions. DOS and Win 95 will assign new drive letters and possibly reassign some old ones. If an application won't run after repartitioning, check its .ini file to see if you need to change a file address to the new drive letter. Expect your CD-ROM drive's letter to change when adding a partition.

Once your partitions are in place, use Format to set up a file system on each partition. Format will apply FAT16 or FAT32, depending on which version of Windows 95 you're using; you can take your pick if you're running version OSR2.

THE EASY (BUT NOT CHEAP) WAY

IF YOU'VE GOT LOTS of software and data, and no handy way to store it while you use Fdisk and Format, you can simplify life by spending a few bucks.

Two great utility programs can repartition your hard disk without moving or losing any data. PowerQuest's Partition Magic and Quarterdeck's Extra-Strength Partition-It (see **FIGURE 4**) can save you hours of toil and frustration, and can also convert partitions from FAT16 to FAT32.

When Windows 98 finally arrives, it will bring a FAT16-to-FAT32 conversion utility that Microsoft claims is easy, safe, and foolproof. We'll take a look and see.

- **Extra-Strength Partition-It** $60 street; Quarterdeck; 800/683-6696; www.quarterdeck.com

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- **Partition Magic** $70 street; PowerQuest Corp.; 800/379-2566; www.powerquest.com

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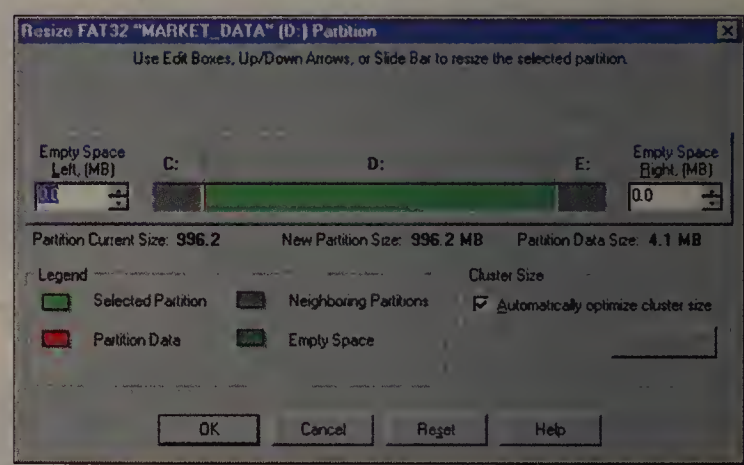
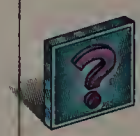


FIGURE 4: SIMPLIFY PARTITIONING with Extra-Strength Partition-It (shown here) or Partition Magic.

AVOID SEEING SPOTS



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Alan Mendleson, Plano, Texas

IF THE DISCOLORATION moves around the screen, it's probably your monitor that's causing this phenomenon. There's a good chance it's just an accumulated magnetic charge on the screen that skews the monitor's electron beams. Press the degaussing button on your monitor's control panel; it's often marked with a little magnet icon. If you don't have such a button, turn the monitor off and on, and it will automatically degauss.

Hardware Tips *welcomes your questions and pays $50 for published items. Kirk Steers is a* PC World *contributing editor. See page 14 for contact information.* ■

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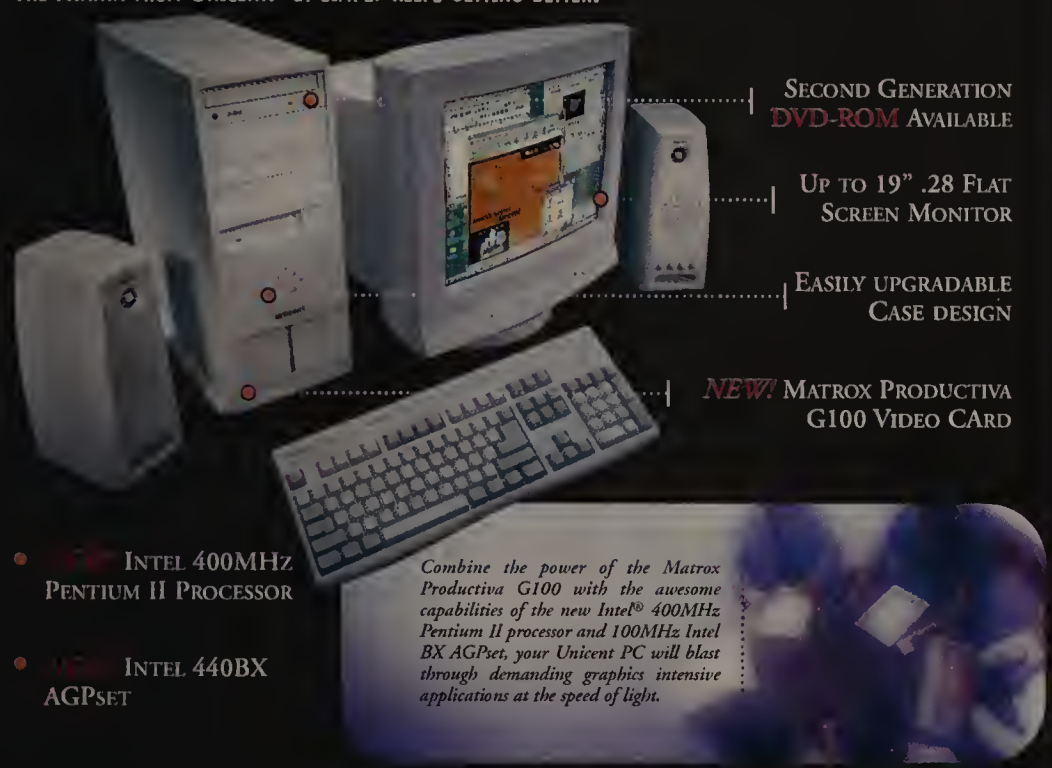

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Soup Up Web Surfing With a 56-kbps Modem

IF YOU'RE STILL poking along in the slow data lane with a 33.6-, 28.8-, or even 14.4-kilobits-per-second modem, it may be time to get in the express lane with a 56-kbps modem. These devices don't actually transfer data at that speed, but if your Internet service provider supports them, they will be faster than what you've been using.

Cutthroat competition has driven modem prices into the cellar. Bargain 56-kbps units are available for as little as $100; most are in the $125-to-$200 range. Higher-end models add extras like voice mail and speakerphone support. (All modems can send and receive faxes these days.)

Initially, 56-kbps modems used one of two incompatible specifications: x2 and K56flex. At press time most ISPs supported only one spec—and on relatively few dial-up lines. This situation should change rapidly following the creation of a single v.90 international standard, defined in February and expected to be formally adopted in September. Modems supporting the new standard were just beginning to ship as we went to press. Additionally, all modem suppliers have promised that users can upgrade their older 56-kbps units to the final standard.

But here the devil, as usual, is in the

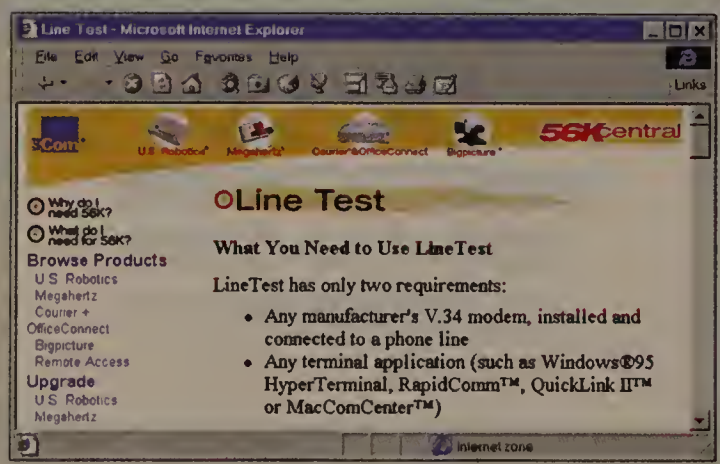
1 Test your phone line. If you doubt that your telephone line can handle high data speeds, test it before buying a new modem. 3Com offers a toll-free bulletin board system that tests your phone line's quality for use with any modem. You can use this to gauge line quality for a K56flex, x2, or v.90 unit.

You'll need a terminal program, not a Web browser, to test the line. In Windows 95 or NT 4.0, select *Start•Programs•Accessories•HyperTerminal*, double-click *Hypertrm.exe*, and follow the directions to connect to the phone number 1-888-877-9248.

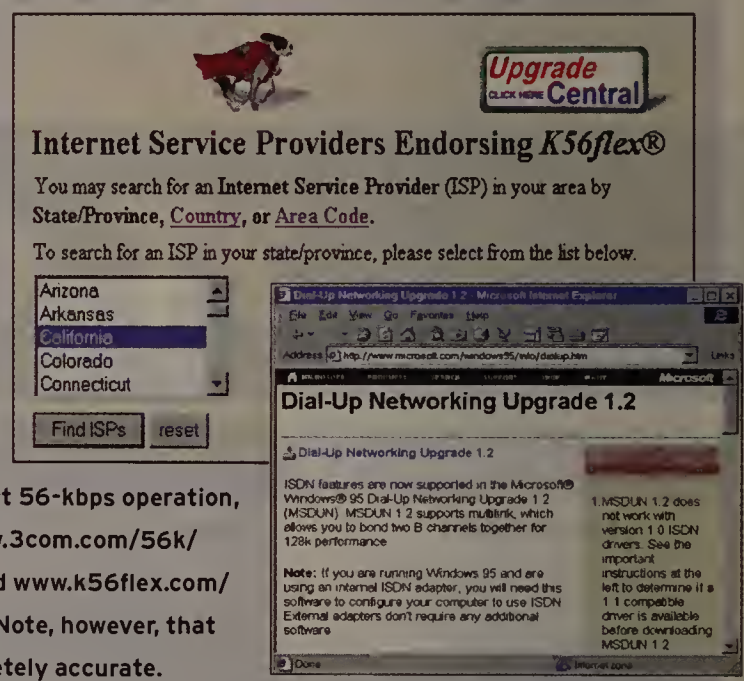
When you're connected, type line test at the 'First Name' prompt, and wait while the line is tested. The BBS will tell you how good (or bad) your phone line is. To get the best indication of line quality, repeat the test at different times of the day.

If it turns out that your line can't handle high-speed data, try the test on a different line if you have one. If the results are still negative, stay with your current modem.

You can find more information about the line test from 3Com's site at ww.3com.com/need4_56k/linetest.html.



2 Find an ISP. Your existing ISP may offer support for x2, K56flex, or the new v.90 international standard—or it may support some combination of the three. Check the provider's Web page, send e-mail, or call its technical support. Also check whether the ISP offers a local telephone number to access 56-kbps services.



If your provider doesn't support 56-kbps operation, check out the ISP finders at www.3com.com/56k/need4_56k/connectnow.html and www.k56flex.com/isprt.html to find one that does. Note, however, that these lists are not always completely accurate.

It's also a good idea to download the latest version of Microsoft's Dial-Up Networking for Windows 95 (www.microsoft.com/Windows95/info/dialup.htm).

3 Buy the modem. The next step is deciding whether you should buy an external or internal 56-kbps modem. If you're upgrading from an existing modem, it's best to replace it with the same type you have now. If you opt for an external unit, make sure that your computer's serial port has a high-speed UART chip—at least a 16550 (most PCs made in the last few years do). For more information on serial ports, see March's *Upgrade Guide*. Also, check out your purchase options in our monthly Top 10 Modems list.

PHOTOGRAPHS: KEVIN CANDLAND

details. Some companies promise a free upgrade, while others say they'll charge a nominal fee. You can upgrade some modems by downloading and installing new firmware from the Web; other units will have to be returned to the vendor for upgrading. (For updates on these issues and on ISP support, visit www.v90.com.)

Among major modem suppliers are 3Com (www.3com.com), Boca Research (www.bocaresearch.com), Cardinal (www.cardtech.com), Diamond Multimedia (www.diamondmm.com), Hayes (www.hayes.com), Logicode (www.logicode.com), Motorola (www.mot.com), Practical Peripherals (www.practinet.com), and Zoom Telephonics (www.zoomtel.com).

It's hard to predict actual data speeds for a 56-kbps modem; most users can expect downloads in the 40-to-50-kbps range. Even in ideal conditions, downloads can't exceed 53.3 kbps because of a federal rule limiting the top speed on dial-up lines to this rate. The data you send is also constrained by technology to 33.6 kbps max, but that isn't a big problem in typical Web sessions, since you download most data.

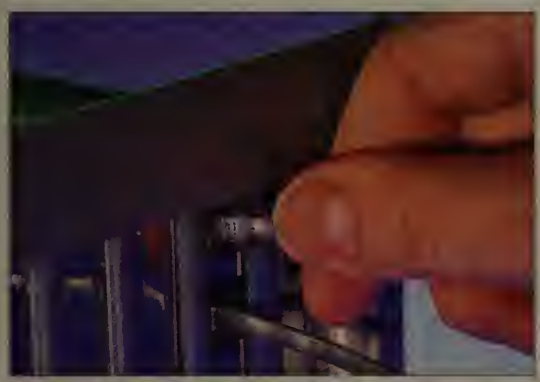
Also, 56-kbps modems are extremely fussy about the quality of phone lines. Especially if you live in a rural area far from a central telephone office, lines can get noisy; a phone line that sounds fine to you may be terrible for moving data at high speed. And in metropolitan areas, telephone companies often combine multiple phone sessions on one channel, which can put you back in the slow lane. To pinpoint where traffic really jams up throughout your Web connection, try VitalSigns Software's Net Medic (download a free trial version from www.vitalsigns.com).

Once you get under the hood, installing a 56-kbps modem isn't much different from installing any other modem. Here's how to do it.

Stan Miastkowski is a contributing editor for PC World. ■

4 Swap modems. If you're installing a new internal modem, unplug the telephone line (and the phone too, if you have one connected through the modem) from the old modem card, remove the cover from your PC, take out the old modem card, and replace it with the new one. Reconnect the telephone line (and phone if necessary). Don't put the PC's cover back on yet.

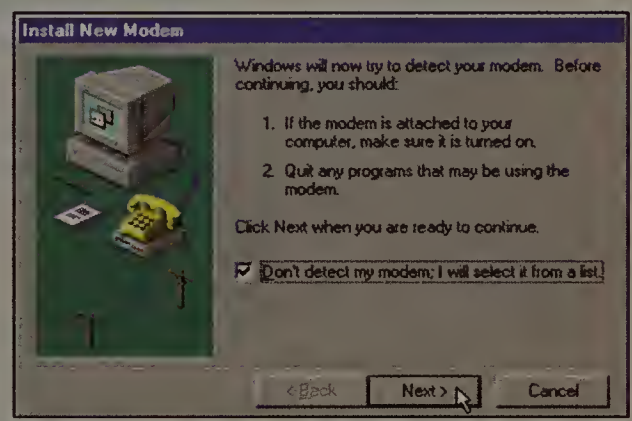
If your new modem is an external unit, disconnect the serial cable and phone line (and a phone if one's connected), remove the old modem, and reconnect everything to the new one. Don't forget to connect the modem's power cord, and turn on the new unit if there is a switch.



5 Configure the modem. Restart your PC. If you installed an internal modem and use Windows 95, it should detect the new device at start-up and ask for the driver. Insert the driver floppy or CD-ROM and follow the on-screen directions. It's a good idea to read the modem manual, too.

If you installed an external modem or are running NT 4.0 (with an external or internal unit), select *Start•Settings•Control Panel* and double-click *Modems*. In the Modems Properties dialog box, make sure the old modem's name is highlighted. Click *Remove*.

Then click the *Add* button. On the next screen, check the *Don't detect my modem* box and click *Next*. Click the *Have Disk* button on the following screen, insert the floppy or CD-ROM that came with your new modem, and follow the directions. You'll eventually see a screen showing that everything's correctly installed.

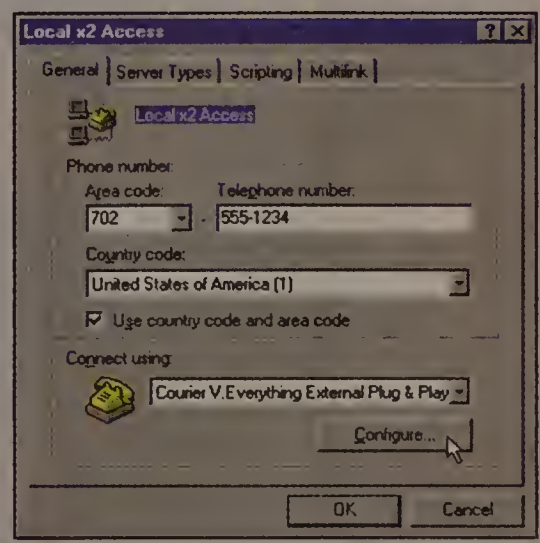


6 Update your ISP information. If you're using the same ISP as before, select *Start•Programs•Accessories•Dial-Up Networking*, right-click the icon for your current connection, and select *Properties*. Make sure your new modem shows in the 'Connect using' box. If your ISP requires a different telephone number for 56-kbps access, fill it in.

If you're using a new ISP, select *Start•Programs•Accessories•Dial-Up Networking*, double-click *Make New Connection*, and follow the steps on screen, typing the required information. Select *Start•Settings•Control Panel*, click *Internet* and then the *Connection* tab, and make sure that this connection is selected as the default for dial-up.

You also need to set up network parameters for your new ISP. Select *Start•Settings•Control Panel*, double-click *Network*, click the *Configuration* tab, highlight *TCP/IP Dial-Up Networking* in the scroll list at the top of the dialog box, and click *Properties*. Type all required information, which your ISP should have supplied when you signed up.

Now you can finally try your new connection. Keep your ISP's tech support number handy in case you have problems connecting.



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#97051	440CDT	133 MMX*	16	1.44GB	10X	12.1" TFT	$1,949
#28416	470CDT	200MMX*	32	2.1GB	10X	12.1" TFT	$2,869
#24680	480CDT	233 MMX*	32	4GB	10X	12.1" TFT	$3,459
Tecra Series							
#92330	730XCDT	150 MMX*	16	2.02GB	10X	12.1" TFT	$1,999
#97055	530CDT	166 MMX*	32	2.1GB	10X	12.1" TFT	$3,099
#28420	550CDT	266 MMX*	32	4.0GB	20X	12.1" TFT	$3,879
#26073	750DVD	233 MMX*	64	4.7GB	–	13.3" TFT	$5,329
#24693	750CDM	233 MMX*	32	4.0GB	–	13.3" TFT	$4,939
Portégé Series							
#97053	300CT	133 MMX*	32	1.6GB	—	10.4" TFT	$1,949
#28419	320CT	266 MMX*	32	3.8GB	—	10.4" TFT	$3,589
Libretto Series							
#97049	50CT	75MHz	16	810MB	—	6.1" TFT	$999
#24678	70CT	120MMX*	16	1.6GB	—	6.1" TFT	$1,949

*Pentium® processor with MMX™ technology.

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#99913	TP380ED	166MHz MMX™	16	2.1GB	20X	12.1" DSTN	$1,699
#28626	TP380X	233MHz MMX™	32	3.2GB	20X	12.1" HPA	$2,379
#99915	TP380ED	166MHz MMX™	16	3.0GB	20X	12.1" TFT	$2,659
#28627	TP380XD	233MHz MMX™	32	4.0GB	20X	12.1" TFT	$3,149
#28625	TP380XD	266MHz MMX™	32	5.1GB	20X	12.1" TFT	$4,549
ThinkPad 560							
#28622	TP560X	200MHz MMX™	32	2.1GB	—	12.1" HPA	$2,379
#96041	TP560	166MHz MMX™	16	2.1GB	—	12.1" TFT	$2,849
#11247	TP560X	233MHz MMX™	32	4GB	—	12.1" TFT	$3,429
ThinkPad 770							
#99904	TP770	200MHz MMX™	32	3.2GB	—	13.3" TFT	$3,599
#99908	TP770	233MHz MMX™	32	4.0GB	—	13.3" TFT	$4,199
#99910	TP770	233MHz MMX™	32	5.1GB	—	14.1" TFT	$4,949

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#97988	Pro 7360	166MMX	32	2.1	10X	12.1" TFT 56k	$2,199
#27832	Pro 7370	200MMX	32	3.2	20X	12.1" TFT 56k	$2,999
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#14708	1540DM	150MHz MMX™	16	2.1GB	20X	12.1" CSTN	$2,199
#26785	1560DM	166MHz MMX™	16	3.1GB	20X	12.1" CSTN	$2,449
#97388	1580DMT	133MHz MMX™	16	2.1GB	10X	12.1" TFT	$2,699
#14710	1590DMT	166MHz MMX™	16	2.1GB	20X	12.1" TFT	$3,199
#26786	1592DMT	233MHz MMX™	32	3.1GB	20X	12.1" TFT	$3,799
Armada 4100/4200 Series							
#26783	4210T	233MHz MMX	32	3.0GB	—	12.1" TFT	$3,399
#26784	4220T	266MHz MMX	32	4.0GB	—	12.1" TFT	$3,899
NEW Armada 7300 Series							
#99535	7330MT	150MHz MMX™	16	2.1GB	—	12.1" TFT	$1,849
#99536	7350MT	166MHz MMX™	32	2.1GB	—	12.1" TFT	$3,349
#24711	7360DMT	200MHz MMX™	32	3.0GB	20X	12.1" TFT	$3,799
#24712	7370DMT	233MHz MMX™	32	4.0GB	20X	12.1" TFT	$4,599
#26787	7380DMT	266MHz MMX™	32	4.0GB	20X	12.1" TFT	$4,899
#26788	7380DMT	266MHz MMX™	32	4.0GB	20X	12.1" TFT	$4,999
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#94060	7710MT	150MHz MMX™	16	1.6GB	—	12.1" TFT	$1,949
#94062	7730MT	166MHz MMX™	32	2.1GB	—	12.1" TFT	$3,349
#94046	7750MT	166MHz MMX™	32	2.1GB	—	12.1" TFT	$3,549
#24713	7790DMT	233MHz MMX™	32	5.0GB	20X	13.3" TFT	$4,799
#23932	7770DMT	233MHz MMX™	32	3.0GB	20X	12.1" TFT	$4,999
#26790	7792DMT	266MHz MMX™	32	5GB	20X	13.3" TFT	$5,549
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*Pentium® processor with MMX™ technology.

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#27302	D5606N	200 MMX*	32	3.2GB	—	—	$1,129
#27304	D5612A	233 MMX*	16	2.1GB	—	—	$1,059
#27314	D5616N	233 MMX*	32	3.2GB	—	—	$1,239
#27308	D5613A	233 MMX*	16	2.1GB	—	10/100	$1,129
#27311	D5614A	233 MMX*	32	2.1GB	24X	—	$1,289

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Order#	Model	Processor*	RAM	HD	CD	Modem	Price
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#99512	8014	200MHz MMX	16MB	2.1GB	—	—	$869
#99513	8017	233MHz MMX	32MB	3.2GB	—	—	$1,079
Advanced Business Models							
#99514	8032	166MHz MMX	16MB	2.1GB	16X	—	$1,019
#99515	8034	200MHz MMX	32MB	2.1GB	16X	—	$1,189
#99483	8037	233MHz MMX	32MB	3.2GB	24X	—	$1,289
Advanced Business Communications Models							
#99484	8172	166MHz MMX	16MB	2.1GB	16X	56Kbps	$1,219
#99485	8174	200MHz MMX	32MB	2.1GB	24X	56Kbps	$1,299
#99486	8175†	200MHz MMX	32MB	2.1GB	24X	56Kbps	$1,389
#99487	8177	233MHz MMX	32MB	4.0GB	24X	56Kbps	$1,449
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*Intel Pentium® processor with MMX™ technology. †Includes an HP CMS T3000 tape backup drive.

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#97427	200MHz MMX™	32	3.2GB	16X	MT	$1,249
#97428	233MHz MMX™	32	3.2GB	16X	DT	$1,349
#14643	PII 233MHz MMX™	32	3.2GB	16X	DT	$1,499
#14641	PII 266MHz MMX™	32	3.2GB	16X	DT	$1,699
#14637	PII 300MHz MMX™	32	3.2GB	16X	MT	$1,999
Deskpro 4000N Series — *Built to NetPC Specifications*						
#14695	166MHz MMX	32	1.6GB	—	DT	$949
#14693	200MHz MMX	32	1.6GB	—	DT	$999
#14691	233MHz MMX	32	2.1GB	—	DT	$1,149

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Network Ready PCs for Enterprise Environments

Order#	Pentium® processor*	RAM	HD	CD	Form Factor	Price
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#97441	166MHz MMX™	32	3.2GB	16X	MT	$1,399
#97442	200MHz MMX™	32	2.4GB	—	DT	$1,199
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#97421	233MHz MMX™	32	3.2GB	16X	MT	$1,499
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*Pentium® processor with MMX™ technology.

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#96203	628266U	200MMX*	32MB	2.5GB	16X	$1,169
#15126	628278U	200MMX	32MB	2.5GB	16X	$1,239
#15124	628286U	233MMX	32MB	2.5GB	—	$1,169
#27406	656113U	PII233	32MB	2.5GB	—	$1,249
#27407	656132U	PII266	32MB	2.5GB	—	$1,439
#27408	656134U	PII266	32MB	4.2GB	—	$1,499
#27409	656135U	PII266	32MB	4.2GB	—	$1,549

*Pentium® Processor with MMX™ technology. † MiniTower Systems

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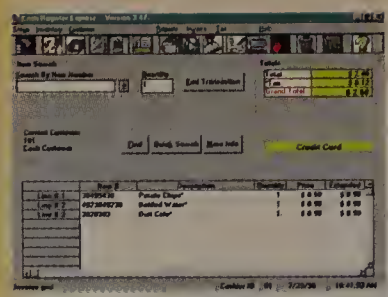

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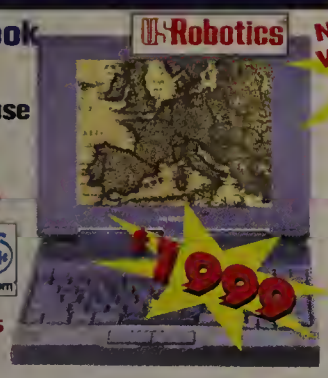

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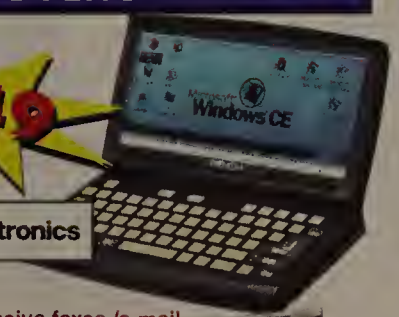

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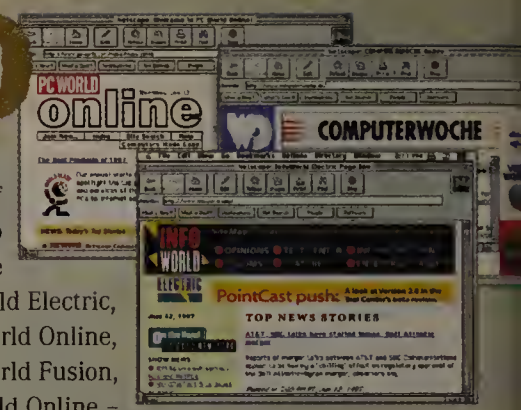

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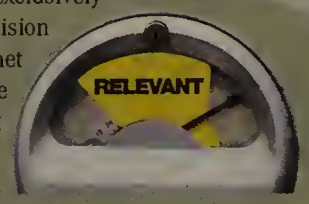

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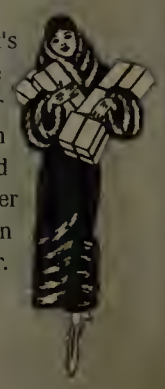

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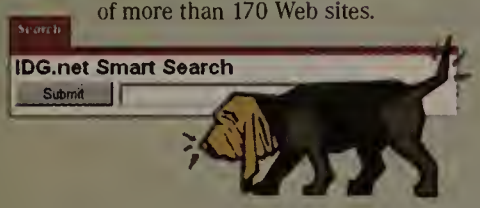

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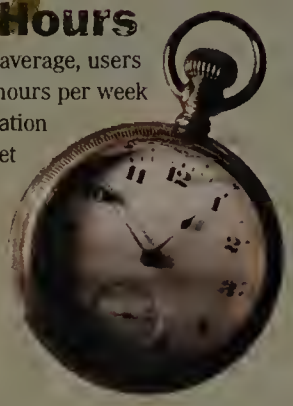

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Netserver 4/66LC-5/133LC (pairs)	4Meg/8Meg/16Meg/32Meg	14/23/49/89
Netserver LE 486SX33 – 486DX266	4Meg/8Meg/16Meg/32Meg	14/23/49/89
Netserver LH Plus 5/133, 5/166 (EDO, ECC)	18Meg/32Meg/64Meg/128Meg	59/99/208/439
Netserver 4/33LM – 5/100LM (pairs)	4Meg/8Meg/16Meg/32Meg	14/23/49/89
Netserver 5/75LS – 5/133 LS4 (pairs)	4Meg/8Meg/16Meg/32Meg	14/23/49/89
Pavilion 5010-7170 (pairs)	4Meg/8Meg/16Meg/32Meg	14/23/49/89
Vectra 500 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	14/23/49/89
Vectra VA 6/180, 6/200 (EDO, pairs)	4Meg/6Meg/16Meg/32Meg	14/23/49/89
Vectra VE2 5/75 – 5/133 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	14/23/49/89
Vectra XA 6/180, 6/200 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	14/23/49/89
Vectra XM4 Series	4Meg/8Meg/16Meg/32Meg	14/23/49/69

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IBM APTIVA, PC, P/S1 & P/S2

Aptiva 300, 500 Series	4Meg/8Meg/16Meg/32Meg	12/26/42/79
Aptiva 700 Series (pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
Aptiva A Series (pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
Aptiva C Series (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
Aptiva M Series	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 330 Models 6571-6576	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 330 Model 6577 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 350 Models 6581-6585	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 350 Model 6586 (pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 350 Model 6587 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 730 Models 6875-6876 (pairs)	4Meg/8Meg/16Meg/32Meg	19/34/57/89
PC 730 Model 6877 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC 750 Models 6885-6886 (pairs)	4Meg/8Meg/16Meg/32Meg	19/34/57/89
PC 750 Model 6887 (EDO, pairs)	4Meg/8Meg/16Meg/32Meg	12/26/42/79
PC Server 310 (pairs)	4Meg/8Meg/16Meg/32Meg	19/34/57/89
PC Server 500 (ECC, pairs)	4Meg/8Meg/16Meg/32Meg	59/79/119/249
P/S 1, 30 Pin Simms	1/Meg/4Meg	10/24
P/S 1, 72 Pin Simms	4Meg/8Meg/16Meg/32Meg	19/34/57/89
P/S 2, 53, 53LS, 56, 57	4Meg/8Meg	29/59
P/S 2 Server, 95, 195, 295 (ECC, pairs)	4Meg/8Meg/16Meg/32Meg	39/41/64/119

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NOTEBOOK & LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY NimH	Li-on
Thinkpad 340, 345, 355, 360, C, CE	*4Meg/8Meg/18Meg/32Meg*	*49/59/89/190*	*.119*	
Thinkpad 365C, CS, CO, E, ED	*4Meg/16Meg*	*34/70*	*.105*	
Thinkpad 365X, 365XO	*6Meg/16Meg/32Meg*	*39/59/149*	*.105*	
Thinkpad 369, 3600, 3650	*4Meg/8Meg/16Meg/32Meg*	*40/39/59/149*	*.119*	*.236*
Thinkpad 500, *510CS*	4Meg/8Meg/16Meg	49/69/99	*.166, 169*	
Thinkpad 560, 560E	*6Meg/16Meg/32Meg/64Meg*	*40/50/140/339*	*.241*	
Thinkpad 799, 729, 750, CL57SX	*4Meg/8Meg/16Meg/32Meg*	*30/79/150/266*	*.149, 175*	
Thinkpad 791, 701C, 701CS	*4Meg/8Meg/16Meg/32Meg*	*20/39/79/159*	*.119*	
Thinkpad 755C, CE, C9, CS	*4Meg/8Meg/16Meg/32Meg*	*40/89/80/109*	*.149*	*.271*
Thinkpad 760C, CD, L, LO	*8Meg/16Meg/32Meg*	*40/89/140*	*.149*	*.271*
Thinkpad 769E, EO, EL, ELO	*6Meg/16Meg/82Meg*	*40/89/140*	*.140*	*.271*
Thinkpad 760XO, 760XL	*6Meg/16Meg/32Meg/84Meg*	*40/50/150/240*	*.140*	*.271*
Thinkpad 7650, 765L	*6Meg/16Meg/32Meg64Meg*	*40/50/150/249*	*.149*	*.271*
Thinkpad 770 (SORAM)	8Meg/16Meg/32Meg/64Meg	79/109/189/299		

COMPAQ MEMORY MODULES

Oeskpro 450, 4100, 575, 590, 5100, 5133	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Oeskpro 575, 5120, 5133, 5150, 5160 (EOO, pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Oeskpro 2000, 4000, 6000 Series (EOO, pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Deskpro 2000, 4000, MMX	16Meg/32Meg/64Meg/128Meg	46/89/199/409
Oeskpro 6000	16Meg/32Meg/64Meg/128Meg	61/99/229/489
Oeskpro 5/60M, 5/66M, XE560 (quads)	4Meg/8Meg/16Meg/32Meg	18/39/54/89
Oeskpro XL 6150, 6200 (ECC, pairs)	8Meg/16Meg/32Meg/64Meg, 128Meg	Call
Presario 510, 520, 524, 660, 720, 724, 860	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Presario 920, 924, 954, 974, 978, 992	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Presario 2100, 2120, 2200, 3020, 3060 (EOO pairs)	4Meg/8Meg/16Meg/32Meg	14/23/39/79
Presario 4112, 4122, 4160, 4402 (EDO pairs)	4Meg/8Meg/16Meg/32Meg	14/23/39/79
Presario 4504, 4508, 4528 (50RAM)	16Meg/32Meg	46/89
Presario 4704, 4706, 4710, 4712, 4714, 4716 (E00 pairs)	4Meg/8Meg/16Meg/32Meg	14/23/39/79
Presario 4764, 4770, 4784, 4786 (5ORAM)	16Meg/32Meg	46/89
Presario 4808, 4814 (50RAM)	16Meg/32Meg	46/89
Presario 7170, 7180, 9536, 9546, 9548, 9564 (pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Presario 9232, 9234, 9240, 9250, 9642, 9660 (pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Proliant 1000 5/60, 2000, R, 4000, R (quads)	4Meg/8Meg/16Meg/32Meg	19/28/54/69
Proliant 1500, 1500R (pairs)	4Meg/8Meg/16Meg/32Meg	18/39/54/89
Proliant 4500, 4500R (quads)	4Meg/8Meg/16Meg/32Meg/64Meg	18/39/59/99/199
Proliant 5000, 5000R (pairs)	32Meg/64Meg/128Meg/256Meg	Call
Prolinea 575, 590, 5100, 5120, 5133 (pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Prolinea 5100, 5120, 5133, 5150, 5166 (EOO pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Prolinea 575E, 100E, 120E, 575MX (pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Prolinea 590MX, 5120MX (pairs)	4Meg/8Meg/16Meg/32Meg	17/29/49/79
Prolinea 6150E, 6180E (pairs)	8Meg/16Meg/32Meg	34/49/79
Prosignia 300 5/75, 5/90, 5/120, 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	18/34/59/89
Prosignia 500 5/90, 5/120, 5/150 (pairs)	4Meg/8Meg/16Meg/32Meg	18/34/59/89

COMPAQ NOTEBOOK/LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY NimH	Li-on
Armeda 1109, 1120T, 1129, 1125	*6Meg/16Meg/32Meg/64Meg*	*40/89/139/269*	*.104*	
Armade 1139, 1139T	*8Meg/16Meg/32Meg*	*49/69/130*	*.104*	
Armada 1510DM, 15200M, 15500MT	16Meg/32Meg/64Meg	69/139/269		
Armada 4100, 4110, 0, 4120 T, 4130T (pairs)	4Meg/8Meg/16Meg/32/64Meg	29/49/79/139/269		
Armada 7710MT, 7730MT, 77500MT	16Meg/32Meg/64Meg	59/139/239		
Cencerie 4/25, 433	*4Meg/8Meg/16Meg*	*49/59/89*	*.195*	
Centure 4/25, 4/25C, 4/25CX	*4Meg/8Meg/16Meg*	*49/59/89*	*.119*	
Contura 409C, 400CX, 419C, 419CX	*4Meg/8Meg/16Meg*	*49/59/89*	*.104*	
Centura 429C, 429CX, 439C, 439CX	*4Meg/8Meg/16Meg/24Meg*	*49/59/89/139*	*.104*	
Centura Aero	*4Meg/8Meg/16Meg*	*40/50/80*	*.104*	
LTE 5900, 5199, 5200, 5399	*6Meg/16Meg/32Meg/64Meg Kit*	*30/70/140/299*	*.136*	
LTE Elite 440C, CX, 4/75CX	*4Meg/8Meg/16Meg/24Meg*	*49/59/80/130*	*.136*	
LTE Lite 425	*4Meg/8Meg/16Meg*	*49/50/76*	*.147*	
Preserie 1000, 1010, 1020, 1030, 1070, 1080	*6Meg/16Meg/32Meg*	*39/69/129*	*.110*	*.217*
Preserie 1207, 1210, 1610	*16Meg/32Meg/64Meg*	*50/139/279*	*.112*	*.236*

DELL MEMORY

Dimension XPS M166S, M2090, P133s, 166s, 200s, P133v, 166v, 200v (5DRAM)	8Meg/16Meg/32Meg	39/49/69
Dimension XP5 P60, P75, P90, P100 (pairs)	4Meg/8Meg/16Meg/32Meg	18/29/49/79
Dimension XPS P100c, 120c, 133c, 166c, XPS P75T, 100T (pairs) FPM or EDD	4Meg/8Meg/16Meg/32Meg	18/28/49/79
Dimension XP5 Pro 150, Pro 200 (quads)	4Meg/8Meg/16Meg/32Meg	18/39/59/99
Dimension XPS Pro 150n, 180n, 200n (Edo pairs)	4Meg/8Meg/16Meg/32Meg	18/29/49/79
Optiplex GL, GM, GMT (Edo pairs)	4Meg/8Meg/16Meg/32Meg	18/29/49/79
Opliplex G5, GXL, GXM, GXMT (Edo pairs)	4Meg/8Meg/16Meg/32Meg	18/29/49/79
Optiplex GXI, GXpro, 6180, 6200 (Edo, Ecc)	16Meg/32Meg/64Meg/128Meg	59/99/184/399
PowerEdge 2100, 4100 (Edo, Ecc)	16Meg/32Meg/64Meg/128Meg/256Meg	59/99/184/399/879

LASER PRINTER MEMORY UPGRADES

AMOUNT UPGRADED	0K Bd	256k	1	2	3	3.5	4	5	6	8	16	32
Brother 630, 631, 641, 645	–	–	39	59	–	–	–	–	–	–	–	–
Canon LBP 430	–	–	19	–	–	–	29	–	–	–	–	–
Canon LBP 860, 1260	–	–	–	14	–	–	29	–	–	39	59	99
Epson Action Laser 1100, 1600	–	–	14	19	–	–	29	–	–	39	59	–
Epson Action Laser II	–	–	74	–	123	–	–	180	–	–	–	–
Epson 8000, 1800, 4000, 4100, 4300	–	–	74	–	123	–	–	180	–	–	–	–
Epson 1000, 1500, 5000, 5200	–	–	–	49	–	–	98	–	–	–	–	–
HP 2, 2D–	–	–	–	59	–	–	79	–	–	–	–	–
NP 3, 30, 3P, 2P+	–	–	–	*50*	–	–	*69*	–	–	–	–	–
HP 4, 4M, 4SI, 4SIMX	–	–	–	14	–	–	29	–	–	59	–	–
HP 4L	–	–	29	–	–	–	–	–	–	–	–	–
HP 4MP, 4P	–	–	9	19	–	–	24	–	–	39	–	–
HP 4+, 4M+, 4V, 4MV	–	–	9	19	–	–	24	–	–	39	59	99
HP 5, 5M, 5MP, 5N, 5P, 5SI, 5MX	–	–	9	19	–	–	24	–	–	39	59	99
HP 5L, 6L	–	–	–	–	–	–	49	–	–	99	–	–
HP 6MP, 6P	–	–	9	19	–	–	24	–	–	39	59	99
HP Design Jet 200, 220	–	–	–	–	–	–	29	–	–	44	–	–
HP Design Jet 230, 250C	–	–	–	–	–	–	29	–	–	44	59	99
HP Design Jet 330, 350C	–	–	–	–	–	–	29	–	–	44	59	99
HP Design Jet 600, 650C	–	–	–	–	–	–	29	–	–	44	–	–
HP Design Jet 650C, PS	–	–	–	–	–	–	29	–	–	44	59	99
HP Design Jet 700, 750C, Plus, 755	–	–	–	–	–	–	29	–	–	44	59	99
HP Deskjet 500, 500C, 510, 550, 560	–	29	–	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/PS, 1600C, 1600CM	–	–	–	–	–	–	29	–	–	44	–	89
IBM Laser 4019, 4019E	–	–	–	–	–	109	–	–	–	–	–	–
IBM Laser 4029, 4037	–	–	–	–	–	–	49	–	–	–	–	–
IBM Laser 4039, 4079	–	–	–	*30*	–	–	*60*	–	–	*09*	–	–
Lexmark, Optra L, LX, R, RX	–	–	–	–	–	–	29	–	–	39	59	99
Lexmark Valuwriter 300, 600	–	–	29	39	–	–	69	–	–	–	–	–
Lexmark Winwriter 200, 400, 600	–	–	29	39	–	–	69	–	–	–	–	–
Lexmark S Series	–	–	–	–	–	–	–	–	–	–	–	109
NEC 90, 290	–	–	–	89	–	–	–	–	–	–	–	–
NEC 95, 97	–	–	–	59	–	–	–	–	–	–	–	–
Oki 400E, 400EX, 410E, 410EX	–	–	67	89	169	–	189	–	–	–	–	–
Oki 810E, EX, 600E, EX, 610E, EX	–	–	29	79	–	–	119	–	–	149	229	–
Panasonic 4420/4450I	–	–	–	79	–	–	109	–	–	–	–	–
Panasonic 4419/4430	–	–	–	*00*	–	–	*199*	–	–	–	–	–
Panasonic 4400/5400	–	–	49	69	–	–	109	–	–	–	–	–
Panasonic 4440, 5410	–	–	89	–	–	–	109	–	–	–	–	–
Panasonic 6500	–	–	14	14	–	–	39	–	–	–	–	–
Sharp 9400, 9460, 9600, 9700E	–	–	49	69	–	–	119	–	–	–	–	–
Sharp 9500, E, H, 9700, H	–	–	49	–	–	–	238	–	–	–	–	–

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TOSHIBA LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BAT. NimH	Li-on
Librette 50CT	*6Meg/16Meg*	*59/90*	*—*	*.161*
Tecra 500C9T, CS, 510COS, C9T	*8Meg/16Meg/32Meg/48Meg/128Meg*	*39/69/129/209/489*	*.231*	*.239*
Tecra 520C0T, 530C0T	*6Meg/18Meg/82Meg/48Meg/128Meg*	*39/60/129/209/460*	*.250*	
Tecra 700CS, 700CT (SORAM)	*8Meg/16Meg/32Meg*	*59/109/209*	*.279*	*.259*
Tecra 710C0T, 720C9T, 730C0T	*8Meg/18Meg/32Meg/64Meg/128Meg*	*60/80/139/250/499*	*.279*	*.259*
Tecra 730XC0T, 740C0T	*8Meg/18Meg/82Meg/64Meg/126Meg*	*69/89/139/259/490*	*.279*	*.259*
T2009SXE	*6Meg*	*79*	*.154*	
T2100 Series	*4Meg/8Meg/18Meg/24 Meg*	*39/40/89/120*	*.104*	
T1900, T4500, T4600, T4700, T4900 All Models	*4Meg/8Meg/16Meg/32Meg*	*39/59/80/149*	*.104*	
T2400, T3499, T3409CT, T3699	*8Meg/16Meg*	*49/74*	*.104, 110*	*.203*
Satellite T100CS, 195CS, 119CS, 110CT, 115CS	*6Meg/16Meg/32Meg*	*59/79/139*	*.104*	
Satellite 200COS, 205COS Series	*6Meg/16Meg/32Meg*	*50/79/130*	*.104*	
Satellite 220C9S	*6Meg/16Meg/32Meg/48Meg/126Meg*	*39/69/139/209/479*	*.196*	*.208*
Satellite T499 Series, T600 Series	*6Meg/16Meg/32Meg*	*69/79/139*	*.196*	*.208*
Satellite Pro 440, 445, 460	*6Meg/16Meg/82Meg/46Meg/126Meg*	*40/89/180/260/469*	*.196*	*.206*
Portege 300	16Meg/32Meg	69/149		
Portege 659CT, 669CT	*0Meg/16Meg/32Meg/64Meg*	*30/80/130/249*	*—*	*.219*

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BAT. NimH	Li-on
ACERNote T30C, 735C, 769C, 760CX, 760CX	*4Meg/8Meg*	*45/64*	*.119*	
ACERNote 763, 765, 782, 784, 786	4Meg/8Meg/16Meg	29/45/69		
ACERNote Light 359, 352, 355	*4Meg/8Meg/16Meg*	*29/45/60*	*.147*	
ACERNote Light 356, 356, 350, 361 (pairs) edo	*4Meg/8Meg/16Meg*	*29/45/60*	*.147*	
ACERNote Nuovo 971, 972, 372, 373, 374	8Meg/16Meg/32Meg	45/69/139		
ACERNote Pro 950, 954, 955, 957, 959 (pairs)	4Meg/8Meg/16Meg	29/45/69		
Ambra N-75, N-199	*4Meg/8Meg/16Meg*	*10/50/89*	*.110*	
AST Ascentia A41, A42	*6Meg/16Meg/32Meg/64Meg*	*39/59/139/279*	*.154*	
AST Ascentia P30, P50	8Meg/16Meg/32Meg	59/89/149		
AST Ascentia J19, J39, J50 (pairs)	*4Meg/8Meg/16Meg/20Meg*	*29/30/89/80*	*—*	*.166*
AST Ascentia 600N, 610N, 000N, 910N	*6Meg/16Meg*	*59/89*	*.195, 147*	*.187*
AST Ascentia 050N	*6Meg/16Meg*	*59/89*	*—*	*.187*
AST Bravo & Explorer	*4Meg/16Meg*	*40/79*	*.119*	
AT&T Globalyst 139, 290, 250	*4Meg/8Meg/16Meg*	*24/30/80*	*103, 155, 109*	
Austin 0X4, 0X2, SX2, SX Series	*4Meg/16Meg*	*60/179*	*.126*	
Austin Edge C0 P-133 edo	8Meg/16Meg/32Meg	59/89/199		
Austin Edge Ouet (pairs) edo	8Meg/16Meg	39/69		
Canon Innova Book 350C0, 360, 475	*6Meg/16Meg*	*39/89*	*.110*	
Canon Innova Book 480, 409 edo	*6Meg/16Meg*	*39/89*	*.119*	
CTX EZ Book ***500***, 600, 700 Pent. Series	4Meg/8Meg/16Meg/32Meg	29/39/69/159	*.138*	
OEC NINote	*4Meg/8Meg/16Meg*	*29/39/89*	*.103*	
OEC HiNote Ultra, Ultra II	4Meg/8Meg/16Meg/32Meg	29/39/69/169		
OEC NINote VP 529, 525, 535, 545 (pairs)	*4Meg/8Meg/16Meg*	*29/39/60*	*.119*	
OEC NINote VP 5100, 5120	*6Meg/16Meg/32Meg/64Meg*	*39/80/129/260*	*.119*	
OEC NINote VP, Css, LSS, CTS, LTS	*6Meg/16Meg/32Meg/64Meg*	*30/89/129/260*	*.110*	
Dell Inspiron 3000	32Meg/64Meg	149/289		
Oell Latitude CP	16Meg/32Meg/64Meg	79/149/289		
Oell Latitude LM (pairs)	*4Meg/8Meg/16Meg/32Meg*	*29/39/69/140*	*—*	*.245*
Oell Latitude 433, C, CX	*4Meg/16Meg*	*49/89*	*.119*	
Oell Latitude LX, M	*4Meg/8Meg/16Meg*	*40/59/89*	*.105*	
Oell Latitude XP, XPI	4 Meg/8Meg/16Meg/32Meg	29/39/69/149		
Epson ActionNote 650, 650c, 660c, 660cx	*4Meg/8Meg/16Meg*	*10/50/69*	*.119*	
Epson ActionNote 689, 666c, 699, 919	*4Meg/8Meg/16Meg/29Meg*	*29/49/79/169*	*.119*	
Epson ActionNote 4LC/25, 4LC/33, 4SLC/2-59, 4000	*6Meg*	*60.00*	*.79*	
Fujitsu Lifebook 500, 600 Series edo	*6Meg/16Meg/32Meg/64Meg*	*39/50/120/230*	*.103*	*.203*
Fujitsu Monte Carlo, Montego, Milan	*6Meg/16Meg/32Meg/64Meg*	*69/139/139/269*	*—*	*.203*
Gateway 2000 Colorbook 4/33	*4Meg/16Meg*	*69/179*	*.112*	
Gateway 2000 Solo Series (pairs)	4Meg/8Meg/16Meg	29/39/69		
Gateway Solo Series 2100, 2200 edo	8Meg/16Meg/32Meg	59/119/209		
Gateway Solo 9000, 9100, 2300	16Meg/32Meg/64Meg	59/139/279		
Hitachi C-Series	8Meg/16Meg/32Meg	39/59/129		
Hitachi E-Series, MX Series	*6Meg/16Meg/32Meg*	*50/89/140*	*.119*	
Hitachi M-Series	*6Meg/16Meg/32Meg*	*59/80/149*	*.104*	
Hitachi Visionbook	*6Meg/16Meg/32Meg/64Meg*	*39/50/140/230*	*.164*	*.217*
HP Omnibook 600	*6Meg/16Meg/32Meg/64Meg*	*69/89/140/250*	*—*	*.145*
HP Omnibook 4999C, CT, C	*4Meg/8Meg/16Meg*	*40/50/80*	*.126*	
HP Omnibook 5000CT, CTS, C, 6500CS	*6Meg/16Meg/32Meg/64Meg*	*59/79/139/259*	*.126*	
Micron MilleniaTransport Pentium (pairs)	8Meg/16Meg	49/69		
Midwest Micro Elite or Soundbook Plus or Sndbk II, IIP	*4Meg/8Meg/16Meg*	*49/60/140*	*.110*	
Midwest Micro Elite or Soundbook CO	4Meg/8Meg/16Meg	49/79/129		
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NEC Versa S, Versa 2900C, 0, 2205C	*4Meg/8Meg/16Meg*	*29/45/80*	*.193*	
NEC Versa 2409 Series, 2539, 2535	*6Meg/16Meg*	*49/79*	*.166*	
NEC Versa 2600 Series	8Meg/16Meg/32Meg	49/89/199		
NEC Versa 4000, 4050/4080, 4200, 4230	4Meg/8Meg/16Meg/20Meg	49/69/89/139		
NEC Versa 6000, 6050, 6030	8Meg/16Meg/32Meg/64Meg	59/89/149/259		
NEC Versa 6200MX edo	8Meg/16Meg/32Meg/64Meg	59/89/149/259		
Packard Bell Statesman	*2Meg/8Meg*	*39/69*	*.108*	
Panasonic CF-V21P, CF-589	*4Meg/16Meg*	*40/84*	*.126*	
Panasonic CF-V41P Series	*4Meg/8Meg/16Meg/32Meg*	*40/50/84/150*	*.126*	
Sager Midern, all models	*4Meg/8Meg/16Meg/32Meg*	*29/49/89/239*	*.Call*	
Samsung Sens 810, 500	8Meg/16Meg/32Meg	59/79/149		
Sharp 3030, 3040, 3070	8Meg/16Meg/32Meg	59/79/149		
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Sharp 6159, 0659, 6669, 7709, 7769	*4Meg/16Meg*	*59/100*	*.131*	
Sharp 6700, 8800, 6009	*4Meg/8Meg/16Meg*	*40/60/100*	*.124*	
Sharp 9000, 9039, 9020, 9050, 9300CD, T edo	*6Meg/16Meg/32Meg*	*50/84/150*	*.290*	*.252*
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Sharp 9080 (pairs) edo	4Meg/8Meg/16Meg	29/49/67		
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TI Extensa, 519, 515 (pairs) edo	*4Meg/8Meg/16Meg*	*29/30/69*	*.147*	
TI Extensa, 559, 555, 500, 565, 070 (pairs)	*4Meg/8Meg/16Meg*	*29/30/80*	*.161*	
TI Extensa, 600, 605, 650, 900, T, CO T edo	*8Meg/16Meg/32Meg*	*30/59/139*	*.147*	
Twinhead, Allima, Compudyne, 486SX, 9X, Tandy 4860	*4Meg/16Meg*	*49/109*	*.135*	
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Call for other products not listed.

COMPUTERS

MULTIMEDIA PC'S

COMPAQ

Presario 2200	MGX-180	16M	1.6G	8X	33.6K	819
Presario 4505	P166MMX	16M	2.1G	16X	33.6K	999
Presario 4508	P200MMX	24M	3.2G	16X	33.6K	1199
Presario 4528	P233MMX	32M	3.2G	24X	33.6K	1499
Presario 4840	Pent II-266	32M	6.5G	DVD	56K	2019
Presario 4850	Pent II-300	32M	6.5G	DVD	56K	2319

MCWORKS CUSTOM-BUILT SYSTEMS

MCWDRKS	Pent 200	32M	2.5G	24X	Opt	899
MCWDRK5	Pent II-233	32M	4.3G	24X	Opt	1241
MCWORKS	Pent II-233	64M	4.0G	24X	56K	1839

ASK YOUR REPRESENTATIVE TODAY ABOUT OTHER MCW CUSTOM-BUILT SYSTEMS!!

WORKSTATION PC'S

COMPAQ

Deskpro 2000	P166MMX	16M	2.1G		3 HD Bays	989
Deskpro 2000	P166MMX	32M	3.2G	16X	3 HD Bays	1029
Deskpro 2000	Pent II-233	32M	3.2G	24X	Matrox 4MB	1749
Deskpro 2000	Pent II-266	32M	3.2G	24X	Matrox 4MB	1929
Deskpro 2000	Pent II-300	32M	3.2G	24X	Matrox 4MB	2179
Deskpro 4000N*	P166MMX	32M	1.6G		10/100TX	1019
Deskpro 4000N*	P233MMX	32M	2.1G		10/100TX	1399
Deskpro 4000S**	P166MMX	16M	2.1G		10/100TX	999
Deskpro 4000S**	P233MMX	32M	2.1G		10/100TX	1439
Deskpro 4000	P166MMX	16M	2.4G		10/100TX	1132
Deskpro 4000	P166MMX	32M	3.2G	16X	10/100TX	1375
Deskpro 4000	P233MMX	32M	3.2G	16X	10/100TX	1879
Deskpro 4000	Pent II-233	32M	3.2G	24X	10/100TX	2029
Deskpro 4000	Pent II-300	32M	3.2G	24X	10/100TX	2279
Deskpro 6000	Pent II-233	32M	2.1G	24X	Ultra SCSI	2359
Deskpro 6000	Pent II-266	32M	4.3G	24X	Ultra SCSI	2859
Deskpro 6000	Pent II-300	64M	4.3G	24X	Ultra SCSI	3429

* no floppy drive, no open expansion bays. ** with floppy & 1 open expansion bay.

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Intellistation Z-Pro series ... ALL MODELS ... IN STOCK
WS M-Pro series ... ALL MODELS ... IN STOCK

TOSHIBA

Equium 5230D	P233MMX	32M	3.0G	24X	10BT / audio	1649
Equium 6230D	Pent II-233	32M	3.0G	24X	10BT / audio	1912
Equium 6260M	Pent II-266	32M	4.0G	16X	10BT / audio	2179

SERVERS

COMPAQ

Prosignia 200	Pent II-233	32M	no HD	16X	Netelligent	1999
Proliant 800	Pent Pro 200	32M	no-HD	8X	Auto Recovery	2099
Proliant 850R	Pent Pro 200	32M	no-HD	8X	Web Server	3109
Proliant 2500	Pent Pro 200	32M	no-HD	8X	5 Plug. Bays	4099
Proliant 5500	Pent Pro 200	128M	no-HD	8X	Netelligent	1099
Proliant 6500	Pent Pro 200	128M	no-HD	16X	exp. 4 Proces.	14699
Proliant 7000	Pent Pro 200	128M	no-HD	16X	18 HD Bays	16719

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Netserver E45	Pent II- 233	32M	no-HD	24X	4 HD Bays	1929
Netserver LD	Pent Pro 200	32M	no-HD	4X	UW-SCSI	2699
Netserver LH	Pent Pro 200	64M	no-HD	12X	exp. 2 P-Pro	4999
Netserver LXE	Pent Pro 200	64M	no-HD	4X	6 Hotswap Bays	8279
Netserver LXR	Pent Pro 200	128M	no-HD	4X	exp. P-Pro	13499
Netserver LX	P Pro 200dual	128M	no-HD	4X	exp. 4 Proces.	15299

IBM

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PC Server 325 series	ALL MODELS	IN STOCK
PC Server 330 series	ALL MODELS	IN STOCK
PC Server 704 series	ALL MODELS	IN STOCK

CALL FOR OTHER MODELS AND SPECIFICATIONS.

NOTEBOOKS

COMPAQ

Presario 1610	P150MMX	12.1"D	16M	1.6G	14X		1919

CTX

EZ350F	P150	12.1"T	16M	2.0G	16X		2099
EZ364D-K	P166MMX	12.1"D	40M	2.0G	16X		1682
EZ354T-K	P150MMX	12.1"Tx	40M	2.0G	16X		1829
EZ364T-K	P166MMX	12.1"Tx	40M	2.0G	16X		1899

FUJITSU

Lifebook 634TX	P133MMX	12.1"T	16M	2.0G	16X	33.6	1899
Lifebook 585TX	P233MMX	12.1"Tx	32M	4.0G	20X	33.6	3149
Lifebook 675TX	P200MMX	12.1"Tx	32M	3.2G	DVD	56K	3657
Lifebook 985TX	P233MMX	13.3"T	32M	5.0G	20X	56K	4299

HEWLETT PACKARD

Omnibook 2000C5	P166MMX	12.1"D	16M	1.4G			1999
Omnibook 2000CT	P133	12.1"T	16M	1.4G			1589
Omnibook 3000	P233	12.1"T	18M	2.1G			3399
Omnibook 5700CT	P150MMX	12.1"T	16M	2.0G			1929
Omnibook 5700CTX	P166MMX	12.1"Tx	16M	2.0G			2579

HITACHI

Visionbook Plus	P150MMX	12.1"D	16M	1.4G	10X	33.6	1719
Visionbook Plus	P166MMX	12.1"T	16M	2.1G	10X	33.6	1899
Visionbook Elite	P166MMX	13.3"Tx	16M	2.1G	10X	56K	2699
Visionbook Pro	P166MMX	13.3"Tx	32M	3.0G	10X	56K	2899
Visionbook Pro	P233MMX	13.3"Tx	32M	3.2G	20X	56K	3599

IBM

Thinkpad 380E	P150MMX	12.1"D	16M	2.1G			1499
Thinkpad 380ED	P166MMX	12.1"D	16M	2.1G	20X		1899
Thinkpad 560E	P166MMX	12.1"T	16M	2.1G			2919
Thinkpad 760XD	P166MMX	12.1"Tx	32M	3.0G	8X	28.8	3981
Thinkpad 765D	P166MMX	13.3"Tx	32M	3.0G	8X	33.6	4099
Thinkpad 770	P233MMX	14.1"Tx	32M	5.4G	DVD	33.6	4959

SHARP

PC9330T	P150MMX	12.1"T	32M	2.1G	14X	33.6	1929
PC9800T	P166MMX	12.1"T	32M	2.0G	10X	33.6	2049
PC9820T	P233MMX	13.3"Tx	32M	3.0G	14X	56K	3679
PC-9340T	P166MMX	12.1"T	32M	2.1G	14X	56K	2149
PCM-100	P200MMX	12.1"T	32M	2.1G	20X	56K	2999
PCM-200	P200MMX	12.1"T	32M	3.2G	20X	56K	3459

TROGON

QUALITAS	P166MMX	13.3"Tx	16M	2.1G	20X	33.6	1524
SUPERU5	P166MMX	14.2"Tx	32M	2.1G	20X	33.6	2746
SUPERUS	P166MMX	14.2"Tx	32M	3.0G	20X	33.6	2878
S.24i	P200MMX	14.1"Tx	32M	3.0G	20X	33.6	2899
SUPERUS	P200MMX	14.2"Tx	32M	3.0G	20X	33.6	2993

TOSHIBA

Libretto 70CT	P120	6.1"T	16M	1.5G			1899
Satellite Pro 440CDX	P133MMX	12.1"D	16M	1.4G	10X	33.6	1569
Satellite Pro 440CDT	P133MMX	12.1"Tx	16M	1.4G	10X	33.6	1949
Satellite Pro 460CDT	P166MMX	12.1"Tx	32M	2.1G	10X	33.6	2859
Satellite Pro 460CDX	P166MMX	12.1"D	32M	2.1G	10X	33.6	1999
Satellite Pro 460CDX	P166MMX	12.1"D	32M	2.1G	10X	33.6	1999
Satellite Pro 460CDT	P233MMX	12.1"T	32M	2.1G	10X	33.6	2849
Portege 320CT	P266MMX	10.4"T	32MB	3.82G		56K	2219
Portege 650CT	P133	11.3"T	16M	1.2G			2099
Portege 660CDT	P150	11.3"T	16M	1.3G	10X		1989
Tecra 520CDT	P166MMX	12.1"T	32M	2.1G	10X	33.6	2899
Tecra 530CDT	P166MMX	12.1"Tx	32M	2.1G	10X	33.6	3099
Tecra 550CDT	P266MMX	12.1"Tx	32M	3.82G	20X	56K	3877
Tecra 730XCDT	P150MMX	12.1"Tx	16M	2.0G	10X	28.8	2149
Tecra 740CDT	P166MMX	13.3"Tx	16M	3.0G	10X	28.8	2839
Tecra 750CDT	P233MMX	13.3"Tx	32M	4.7G	20X	56K	4949
Tecra 750CDM	P233MMX	13.3"Tx	32M	4.7G	20X	56K	4899
Tecra 750DVD	P233MMX	13.3"Tx	64M	4.7G	2xDVD	56K	5299

LEGEND- D=Dual scan, T=Active matrix, Tx=Active XGA 1024x768, G=gigabyte X=CD speed

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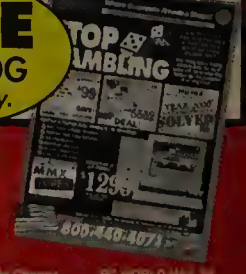

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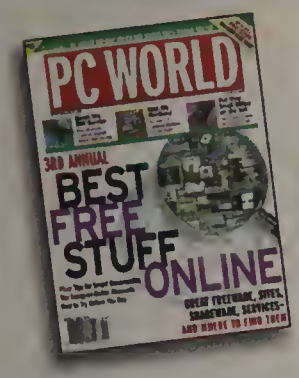

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Deskpro 2000

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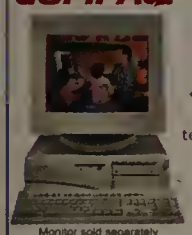

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Acer

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Tecra notebooks
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530CDT 166/MMX 32MB 3.8GB 12.1" AM 10X 3127.26
550CDT 266/MMX 32MB 3.8GB 12.1" AM 3847.63
740CDT 166/MMX 16MB 3GB 13.3" AM 10X WIN NT 2997.15
740CDT 166/MMX 16MB 3GB 13.3" AM 10X 2787.59
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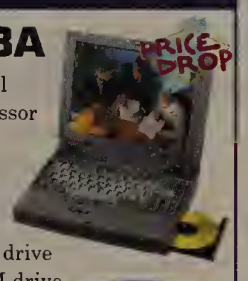
750CDM 133/MMX 32MB 4.77GB 13.3" AM 20X 4787.16
750DVD 233/MMX 64MB 4.77GB 13.3" AM DVD 4987.69
Portege notebooks
320CT 266/MMX 32MB 3.8GB 10.4" AM 3567.56

Satellite Pro 460CDX

TOSHIBA



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COMPAQ

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COMPAQ

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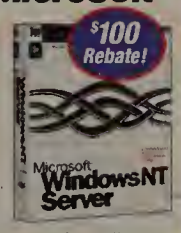

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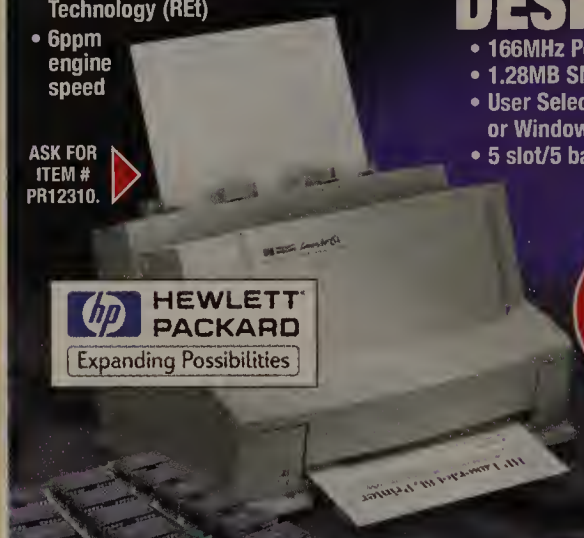

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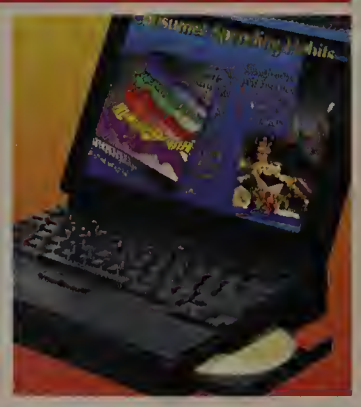

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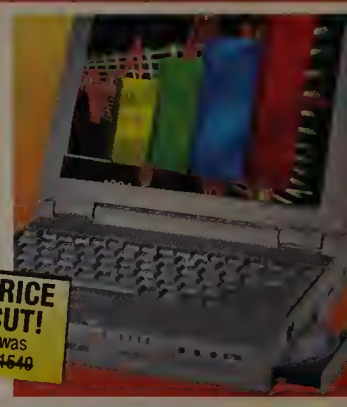

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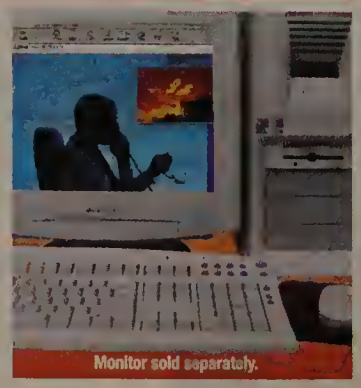

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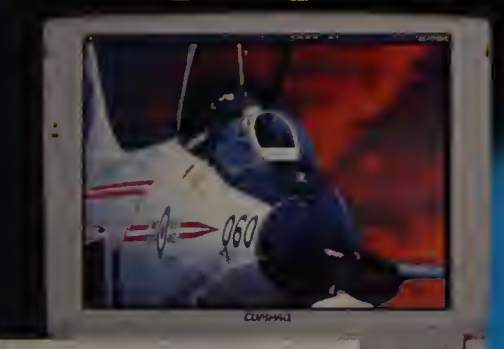

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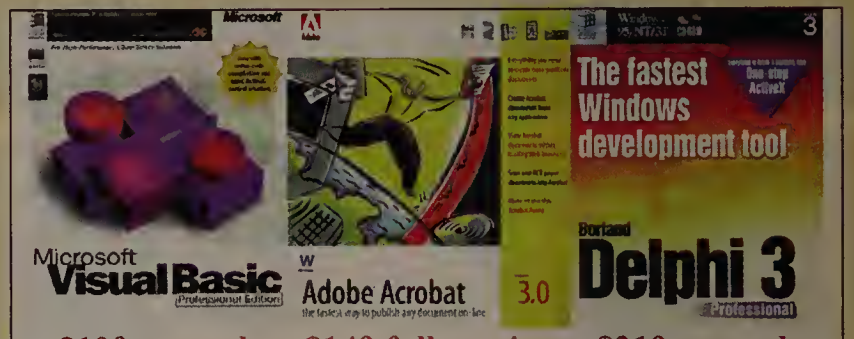

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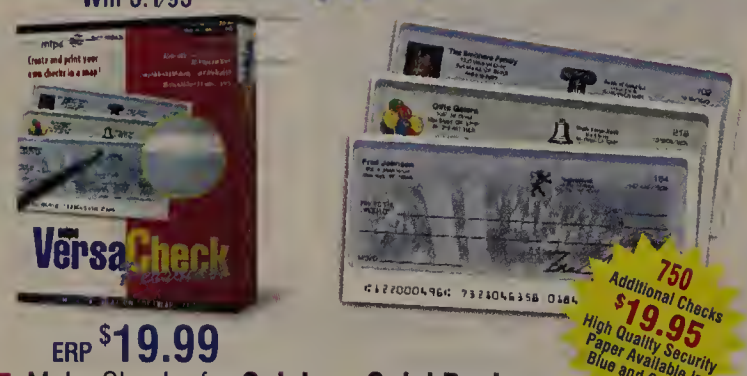

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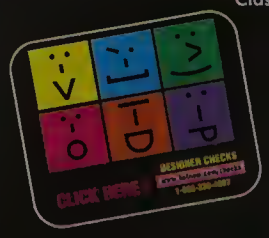

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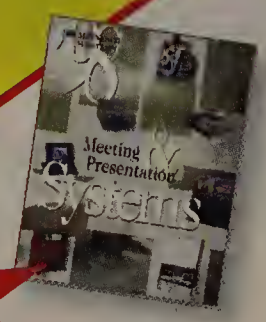

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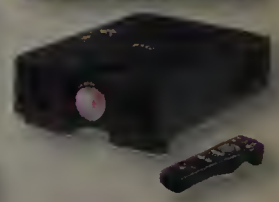

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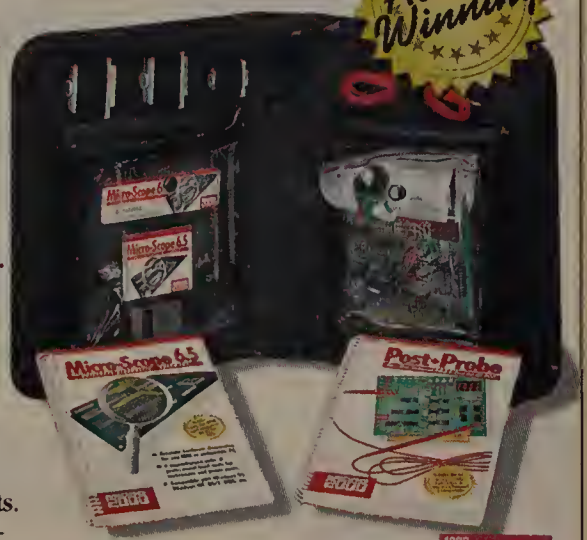

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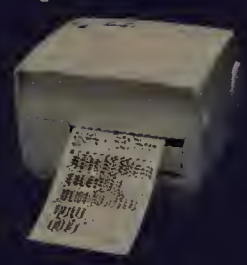

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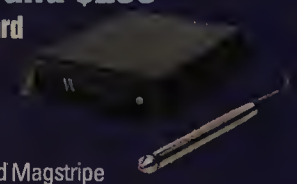

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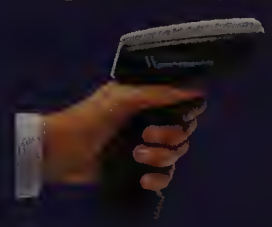

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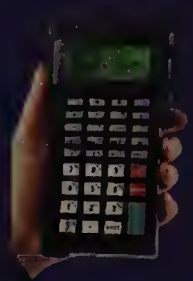

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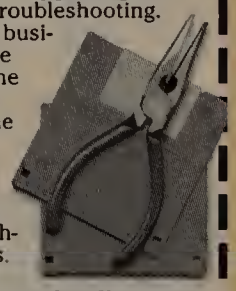

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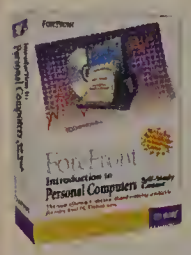

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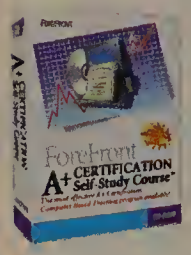

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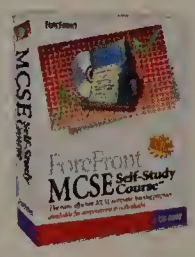

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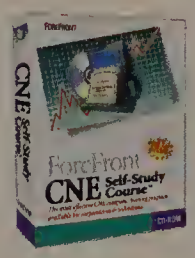

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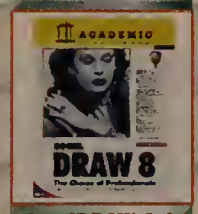

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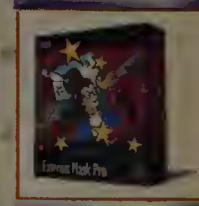

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CIRCLE 498 ON READER SERVICE CARD

Custom ULTRA 2 SCSI Cables - Terminators - Cases

If you want Ultra SCSI Performance use our Teflon Cables & Active Terminators. Our knowledgeable SCSI Technicians will solve all your SCSI problems

SCSIVue™ Active Terminator

From: $59

Four models available with optional Remote LED Pak. These are the finest terminators available, they fix SCSI problems and improve reliability.

Benefits:
- Improves SCSI Bus Performance
- Less Errors; More Reliable Data Transfer
- Diagnoses Problems • Analyzes Signal Quality

Features:
- Active Regulation • *Fast 50 & Fast Wide 68*
- Status Indicators • Gold Contacts

Active 2-1 SCSI Switch / Repeater

From: $599

Benefits:
- Up to 14 Devices to 1 Computer
- Share Devices Between 2 Computers

Features:
- 2-1 Active Digital Switch/Repeater
- Regenerates SCSI Signal for Long Runs

Gold Diagnostic Adapters

Styles: Gender Changers
- Both 50 pin and 68 pin (all combinations)

Gender Changer

Drive Bus Changer (run 68 pin on 50 pin bus)

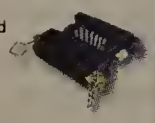
Styles: 68 pin Drive to 50 Bus
- 68 Pin Drive to 50 Pin IDC (runs wide drive as narrow)

Styles: 68 Pin Adapter Wide to 50 Pin Narrow
- 68 Pin External Adapter to 50 Pin (converts Host Adapter)

$49

68 Pin to 50 Pin Centronics or 50 Pin MicroD Adapters

Styles: For Adaptec Ultra Wide Card
- Adapters with partial termination built in for 68 to 50 converters (converts Host Adapter)



Gender Changer

$9

25 Pin Male to Male or 25 Pin Female to Female

Styles: Custom Adapters and Connectors that match most needs. If we don't have it we can make it.

From: $29

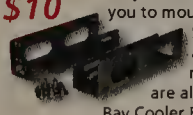
$39 Styles: Converts the 68 pin connector on a 68 pin cable to a 50 IDC female connector so that a 50 pin drive can be used on the 68 cable.

Styles: Converts the 80 pin SCA type drives to be used with either 50 or 68 pin SCSI Buses. Three models available.

From: $39

Drive Bracket Kits - 3.5" to 5.25"

From: $10



We carry a variety of Brackets that allow you to mount a 3.5" drive into a 5.25" bay. They include all screw and hardware necessary. Face panels are also available. Also see our Bay Cooler Fan and Bracket Kits.

Hot Swap Powered Terminator

$69

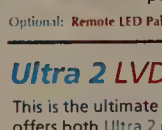
Now you can safely remove any SCSI device from a SCSI chain by simply clicking a switch. The Hot Swap Powered Terminator also has an optional Power Supply so that it can supply termination power to portable setups or when termination power is not being supplied.

Optional: Remote LED Pak and Power Supply Available

Ultra 2 LVD Wide Terminator

This is the ultimate terminator on the market. It offers both Ultra 2 (LVD) operation and standard Ultra Wide or Fast Wide operation, all in one unit. Automatically senses which type of bus you are using and configures itself to that bus. Add our unique diagnostic capabilities and you have the ultimate terminator. Optional remote LED pak is also available. Just plug it into the front of the terminator and then mounted it on the front of your computer or monitor. Allows for easy monitoring of the SCSI bus.

$149



SCSIVue™ Gold Diagnostic Cables

Benefits:
- No Loss Of Important Data
- Faster Performance
- Test Cable Integrity

Features:
- Diagnostic Indicators • Large Ferrite Filters
- Triple Shielding (Unique Design)
- Double Gold 20u" Plated Connectors
- Extra Heavy 26 Gauge Wire • 100 Styles in Stock

From: $39

Teflon® 90 Ohm External Cables

From: $159

Benefits:
- Ultra SCSI 40 MB/s operation
- Fixes Ultra SCSI Cable Problems

Features:
- Perfect 90 Ohm Impedance Match
- Triple Pronged Connector With Gold contacts

Gold .8mm Ultra SCSI Cables

Benefits:
- Faster Performance
- Test Cable Integrity
- No Loss Of Important Data

Features:
- New .8mm Ultra SCSI Connector
- Triple Shielding (Unique Design)
- Double Gold 20u" Plated Connectors
- Diagnostic Indicators • Large Ferrite Filters

From: $109

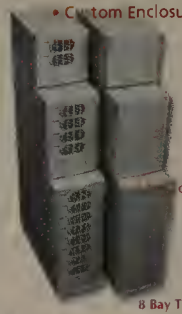
14 & 29 Bay Ultra SCSI Towers

From: $999

14 & 29 Bay - *The Ultimate Large SCSI Storage Solutions*
Shown with optional Bay Coolers and Dual Redundant Power Supply.
Multiple SCSI Channel Support and Modular Designed Expansion.

Gold External Ultra SCSI Cases

- Ultra SCSI Custom Teflon Cable Available
- Custom Enclosures in 1 Day for Raid & Arrays



8 Bay Tower

From: $99

2 Bay Tower

Temperature ALARM!
Automatic Monitor & Control

The Vertical 3.5" Case Kit offers a small transportable package. Ideally suited for moving around, this durable case can take a beating. Universal 35 Watt power supply.

From: $59

The Horizontal 3.5" or 5.25" Case Kit Offers a stackable solution for any desktop need. Shown with Optional Bay Cooler installed.

Open Face and Closed Face Models Available.
Optional 50 or 68 Teflon® Cables Available.

Dual Fan & Bracket $29

Bay Cooler Kit keeps those **HOT Ultra SCSI Drives** COLD as ICE!

HOT SWAP Pull Out Bays
Compatible with all 50 pin & 68 pin SCSI Buses up to Fast SCSI 2. **From: $79.00**

RACK MOUNT *8-Bay* Commercial Grade Quality
Shown with optional Bay Coolers and Dual Redundant Power Supply.

From: $399

OPTIONS:
- Ultra SCSI Cable Kit
- Dual Redundant Power Supply
- Bay Coolers w / Brackets
- Temperature Alarm System
- Slide Out (400lbs rated) Rails

Temperature Alarm Systems

Temperature is the number one cause for drive failure. Keeping the drives monitored can now easily be done. System include outputs for emergency additional fans and computer notification.

Cool Dual Fan SCSI Cases

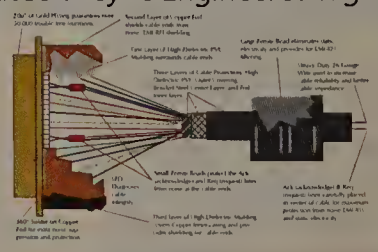
Ultra SCSI 40 COMPATIBLE

Fast SCSI Drives get HOT...but don't worry we have the perfect solution. Our new Dual Fan SCSI Cases keep any drive cool. Temperature is a drives worse enemy.

$69

Granite Cables Are The Best Because They're Engineered Right.

Granite Cables were designed by SCSI Engineers to be the **Best Cables On The Market.** Everything about them means better performance and higher reliability. Our design incorporates an exclusive shield that protects the Acknowledge and Request lines from noise. Large Ferrite beads are installed on all cables to protect them from static and noise. Every cable incorporates a LED indicator that lets you know it is operating properly. We also use more GOLD on every cable. Add to this our impedance matching techniques and you have most of what makes us THE BEST!



NEW! ULTRA 2 SCSI 2X SPEED - 80 MB/s!!!

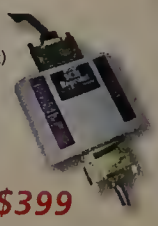
This is the fastest SCSI available! Twice as fast as Ultra 1 SCSI and without any of its limitations. If you want true horsepower this is the Ultra SCSI system to buy. Completely backwards compatible with Ultra 1 SCSI, Fast SCSI, and SCSI 1& 2!

The key to this new SCSI Standard is the use of Low Voltage Differential Technology. Also known as (LVD) and Ultra 2 SCSI, we can now achieve speeds that far exceed even the fastest computers data thruput capabilities.

Ultra 2 (LVD) - SCSI Repeater / Converter

Now you can take all your SCSI devices and run them any distance you want, (up to 75 feet) while sharing the Ultra 2 SCSI bus. This revolutionary Repeater / Converter will give you, not only long cable distance, but also complete compatibility with the new Ultra 2 standard. There is no need to have two SCSI Adapters taking up precious PCI slots. Two models are available, the internal model that mounts into your enclosure, Raid/Array case, and the external model that can be used anywhere.

$299



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Custom Teflon® Internal Cables

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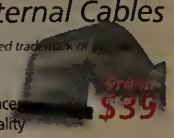


From: $39

Benefits:
- Less Errors, Ultimate Performance
- Silver Wire Improves Signal Quality

Features:
- Perfect 90 Ohm Impedance • Custom in 1 Day
- Triple Pronged Connector - Gold contacts Silver Wire

68 Pin Internal Cables, custom or stock, from 1 to 15 SCSI devices per cable. We can also make Custom 68 pin and 50 pin Combination Cables that allow you to use narrow drives on a wide cable.

Active Digital SCSI Repeater

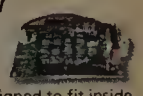
PS Included

From: $139

Benefits:
- Models for all SCSI types
- Fixes SCSI Cable Problems
- Doubles Cable Length (up to 18')

Features:
- Active Termination and Signal Purification
- Ultra Fast Performance for Added Capabilities
- Diagnostic Capabilities • 30u" Gold Contacts

OEM SCSI Repeater



If you integrate SCSI Raids or Arrays and are having problems making it work, the Granite SCSI Repeater will make it work. Designed to fit inside any computer or external case. These repeaters will double the cable length of any scsi bus allowing you to achieve the needed distance to make your system operate. Up to 3 repeater can be used.

SCSI Cable Tester - LED Readout

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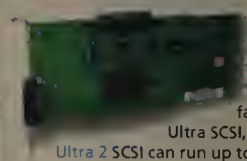

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953	Windows 95 software	957	Network/sharing products	961	Mail order companies
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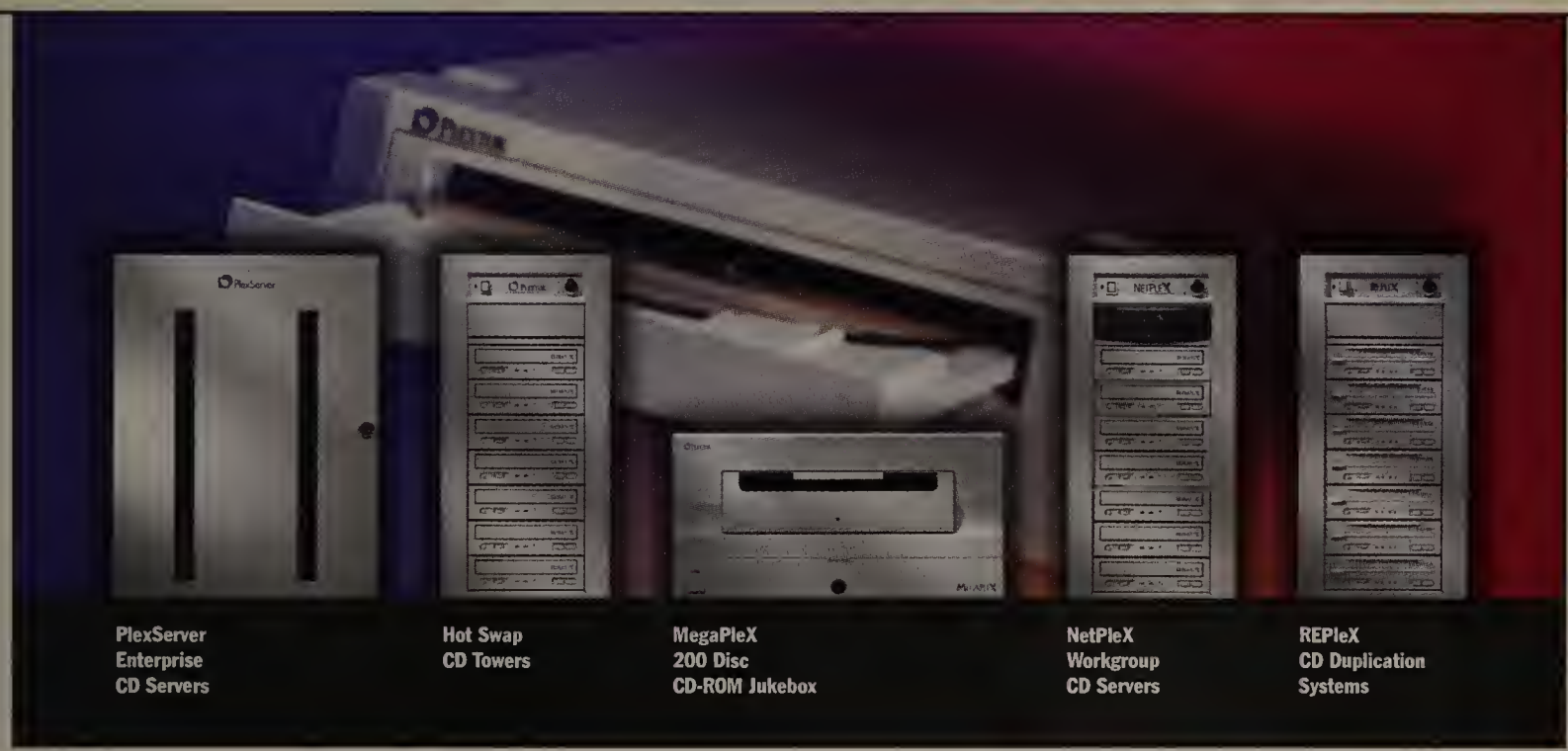

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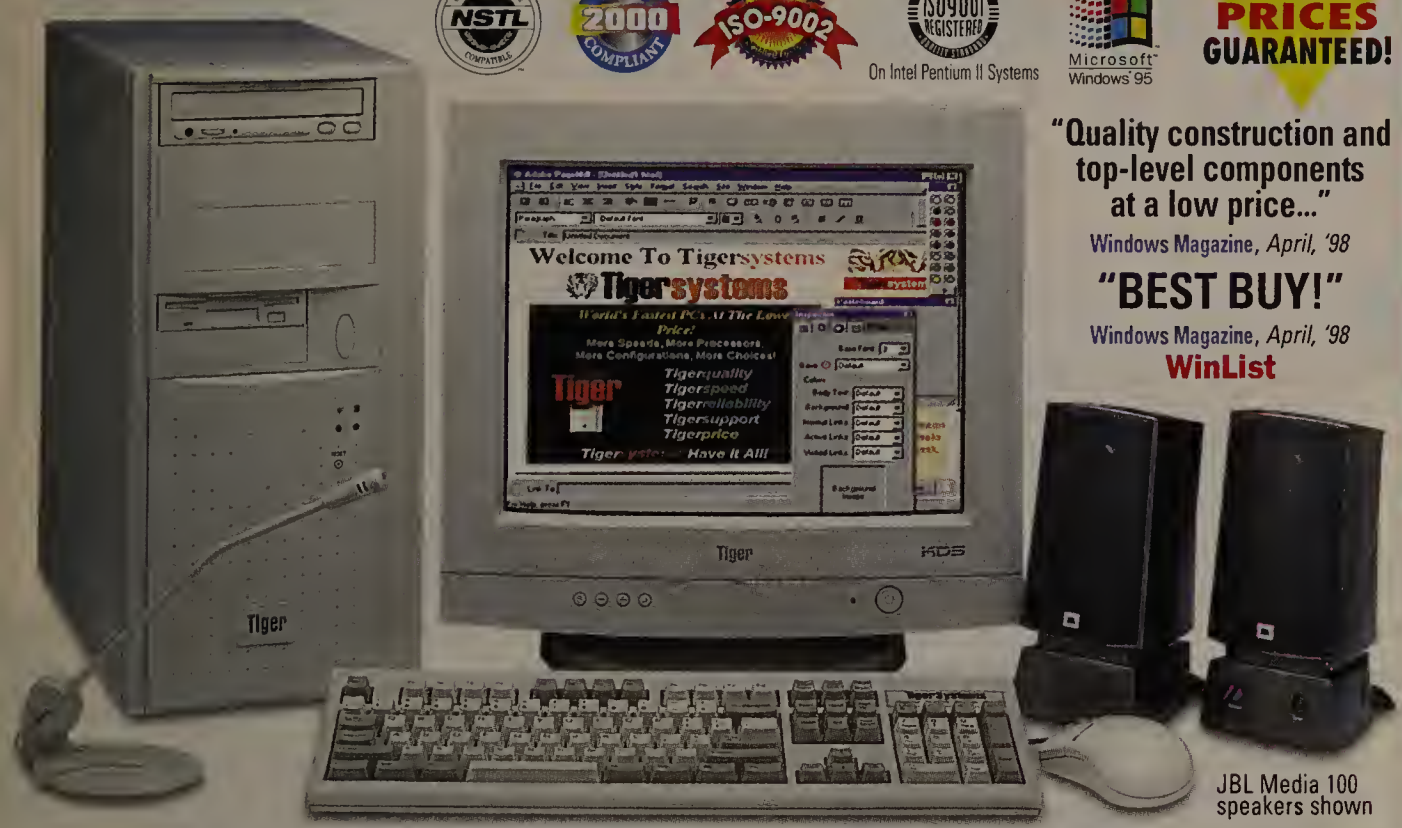

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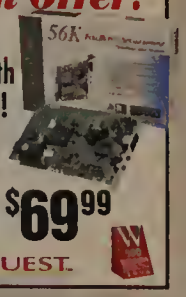

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Circle 229 on reader service card

You May Lose Your Right to Sue

I HEAR THE LINE MORE OFTEN than I want to, usually from somebody at wit's end. After days, weeks, or months of trying to get a vendor to fix its shoddy products, deceptive marketing practices, or lousy support policies, out come the words, "I ought to sue."

Cooler heads usually prevail, because legal action is rarely cheap, seldom easy, and almost never fun. But when a company refuses to budge, the law may be all you have left. And sometimes it gets results.

America Online knows that all too well. First, a class action suit representing hordes of angry customers went after AOL over its sneaky practice of adding 15 seconds to the actual connect time and rounding up to the next minute. In a 1996 settlement AOL agreed to cough up over 1 million free hours, pay up to $700,000 in cash and $2.75 million in legal fees, and publicly disclose how it counted the hours. Last year, when the initiation of "unlimited" service strained AOL to the breaking point, legal action by state attorneys general and a separate class action suit again forced the company to issue refunds and change its business practices.

New contracts could force you to agree that by using the software you accept its flaws, no matter how egregious.

SURFEIT OF SUITS

TWO RECENT SUITS helped shake up Iomega. The first regarded botched rebates for Zip disks and drives; in a settlement, the company agreed to issue a modest credit to people who were paid late and to reconsider those whose claims were unfairly denied. If you're in the latter group, you may have to speak up by May 8; see www.iomega.com/company/rebate/ for details.

The second suit, which concerned Iomega's policy of charging for support calls, is far more important. In that settlement Iomega agreed not only to extend warranties and offer discounts to people whom it originally charged, but also to improve its support. The company will establish new interactive Web and telephone databases, limit average phone hold times for live tech support to 10 minutes, answer general product questions for free, and make its fee-for-support policies clearer.

As I write this column, class action suits are pending against IBM over alleged problems with the Mwave chips in some of its PCs and against Compaq over past fee-for-support practices. Cynical souls always whine that in class actions the lawyers end up with most of the money. That doesn't bother me. In the absence of regulatory bodies, these suits are often literally the court of last resort, and they perform the useful public function of keeping businesses honest. The truly shocking thing is that companies like Iomega and AOL let things get so far out of hand that they almost begged to be hauled before a judge. In fact, given the quality of today's hardware and software, it's a wonder these suits are relatively rare.

2B OR NOT 2B?

THEY MAY GET EVEN RARER, if new changes to the Uniform Commercial Code are approved. As I understand it—and I hereby admit that I am not a lawyer, this stuff is complicated even for attorneys, and there are compelling arguments on both sides—the proposed Article 2B could make it easier for software makers to wriggle out of responsibility to their customers.

Among other things, Article 2B changes the definition of software from "goods" that are "sold" (and therefore covered by consumer-protection laws) to "intangibles" that are licensed under virtually any terms the vendor may choose. In other words, new shrink-wrap contracts could force you to agree that by using the software you accept all its flaws, no matter how egregious, even if the manufacturer knew about them beforehand. A contract could even prohibit you from criticizing the product in public; after all, you had a chance to return it before clicking 'I agree'.

A good place to begin studying Article 2B is at Ralph Nader's Consumer Project on Technology site (www.cptech.org/ucc/ucc.html). Warns Cem Kaner, an attorney and software development consultant, "We're taking the most consumer-hostile laws that have been proposed in the 20th century, and we're going to apply them to all of 21st-century technology."

That sounds like something we shouldn't leave to the lawyers.

PC World *contributing editor Stephen Manes is a columnist for the* New York Times *and is half of the* Digital Duo, *a technology program on public television.* ■

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